# FOUNDATION STONE: POETRY'S PLACE IN SCIENCE AND THE SPIRITUAL

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**Abstract**

This thesis proposes that certain contemporary poems may contribute the function of dialogue between scientific and spiritual ideas. It examines where perceived margins of conflict historically arose and currently exist between spirituality and science, discovering the primary contributor to be the scientistic impulse rather than the practice and practitioners of science, though tensions however culturally persist. Special focus is given to the combination of the inner and outer (subjective and objective) states of conscious experience and how their combination largely allows for dialogue to occur in the poetic context. Also proposed is how poetry acting as the converging locus of inner and outer consciousness makes it essential to this dialogue. The necessity of the intended dialogue is contemplated within the context of a divided self, as well as a larger fragmented identity formed by the arbitrary isolation of consciousness from objective reality. The ontological and epistemological authorities of poetry are explored, as is the possibility of textual evidence of the soul and defining a poetics of spirituality. Investigation is given over to the ways scientific language use differs from that of poetry, and how its necessary inclusion in poetry may benefit poetry's dialogic properties, contributing a scaffolding of meaning and global 'bank' of shared information, which offers cosmological unity. Further consideration is given to what benefit the combination of poetry, science and spirituality conveys and the importance of the individual subjective experience. A number of particular approaches are discussed to determine formal and rhetorical methods within the writing of poetry that create the proposed dialogic properties, including: reinventing and redefining spiritual concepts via scientific subject matter and theories; poetry's employment of ratios of meaning to quantify the 'unquantifiable'; linguistic representation of qualia and lived experience reconciled to

empirical fact (each contextualised within the analysis of contemporary poetic works); and, within the context of the author's own creative book of poems: employing metaphor's dual ability to both produce ontological statement and remain open-ended; the use of scientific image functioning as hypothetical axiom; and poetry as formal experiment. Throughout, contemplation is given over to concerns of materiality and immateriality and the nature of reality, the Cartesian division of mind and body, poetry's able handling of uncertainty and clarity, and the necessity of hybrid consciousness. The consideration of voice and dialogue centres on the impulse in poetry to communicate to an intended 'you', and poetry's appeal to suture the gap between our own and others' isolated consciousness. The conclusions reached within this thesis are how poetic experimentation, inventing new images, creation of metaphor, and poetry's inherent dialogism work against finality and contribute to further possible future conversation between science and spirituality, as well as creating new imaginative possibilities for wholeness. Additionally, it reinforces the value of poetry's continuing experiment to observe, evaluate, and make sense and meaning out of personal human experience. The accompanying original work of creative writing, in the form of a collection of poetry entitled *Twelve Foundation Stones of the New Heaven*, aims to embody the ideas proposed within the following critical thesis.

## Introduction

> In short, there is no necessary battle between our different parts; there is merely a great difficulty in seeing ourselves as whole.
>
> –Mary Midgley, *Science and Poetry*

English philosopher Mary Midgley's pivotal book *Science and Poetry* (2001) opens with its ambition: 'This is a book about personal identity, about who and what we are. It is about the unity of our lives.'[1] This vast concept is linked specifically with what Midgley calls 'the various aspects of our selves which get separated by being involved in the different arts and sciences,' and Midgley is asking how we can bring them together within the whole of our lives, 'in particular…how we can bring together our ideas of *science* and *poetry* within a whole that has a place for them both.'[2] The healing of this division of the self, this unification of the personal whole, whilst complicated by a variety of factors, is in Midgley's view largely prevented by 'the strange, imperialistic, isolating ideology about science'[3] that has been perpetuating through several centuries. However, Midgley recognises that this 'tribal belligerence'[4] has culprits on both sides, and in literature a 'strange kind of apartheid' exists in the teaching of literature, avoiding scientific subjects. This results in learners facing a forced dichotomy: 'they may study either the outer *or* the inner aspect of human life, but must on no account bring the two together.' This separation of inner and outer life then continues to rend the self apart, as well as the larger arena of our

[1] Midgley, M. (2001) *Science and Poetry*. London: Routledge Classics.
[2] Ibid., p. 1.
[3] Ibid., p. 1.
[4] Ibid., p. 28.

collective lives as a whole. As Midgley emphasises, 'despite the efforts of many reformers, Descartes still rules. Mind and body are still held apart.'[5]

Yet it is not only poetry that explores and represents the inner aspect of human life. For many centuries of human existence, it has fallen also to religion and spiritual seeking to address the concerns of the inner human experience. As Ugo Bianchi (1975) discusses in *The History of Religions,* the 'universality of the religious element in all civilizations' has existed throughout history. Within this 'element' exists:

> …the profundity of the existential and spiritual interests involved in religions, not only in the context of their external institutions but also in that of the inner life of individuals…an inner life to which…is entrusted the essential dynamism of the religious phenomenon in history.[6]

Whilst this inner life has been entrusted to the religious phenomenon, as Bianchi says, perhaps even because of this, an opposing view gradually arose with aims to discredit it entirely. The cultural foundations of this battle are far less straightforward than they seem (see Part I, in which the origins and contexts of this conflict are given full examination), yet they have permeated our views of self, soul, identity and meaning. This battle between inner and outer is, as Midgeley says, not necessary. One way to begin healing the rift is to begin to encourage all sides of the conflict to speak to each other.

Though, as is more thoroughly discussed in Part I of this thesis, I distinctly avoid focusing on religion itself as a term and concept in order to differentiate spirituality from external religious systems, this domain of the spiritual inner life is no less significant within the context of my research. It is as essential to the conversation as it is a widespread part of human life. The spiritual and religious aspect has consistently been a distinct pathway for exploration of the inner life, a place where its

[5] Midgley, p. 29.
[6] Bianchi, U. (1975) *The History of Religions*. Trans. G. Castelliani. Leiden, The Netherlands: E.J. Brill. p. 30.

legitimacy and profundity is recognised. Within the margins of conflict between spirituality, science, and poetry, the inner life has been persistently beleaguered. Where I provide context and analysis of these margins of conflict, I also explore why respect towards and study of the inner life is essential to restoring the wholeness that Midgley advocates. Not least, I examine and exemplify poetry's contribution to reconciling the inner and outer life. The value of the external, the objective, the scientific is essential and should also not be underplayed, however. As is also discussed in Part I, the aforementioned tribal belligerence has clearly extended to the area of religion, from which spirituality finds its origins. Science's contributions are wholly essential and necessary to the conversation, and for advancing poetry's abilities for participating within it.

If 'the term *holy* comes from linguistic roots signifying wholeness' and 'well-being' whilst 'the unholy, then, is the fragmentary' and 'the ailing,'[7] what Midgley advocates is a holy renewal of our whole identities through making a space in which poetry and science can coexist, where the soul and the brain can share a space, where the mind and the body are no longer divided. As we will explore in Part II of this thesis, poetry has an important role to play in finding a pathway of dialogue between these fragmentary parts, but also, that science is an important component of this unity being restored as well. As is evidenced in my discussion of Dickinson, neither perspective can be left out. The final section of this thesis, Part III, investigates my own attempts to craft a collection of poetry that embodies this intersection of science and spiritual ideas, and seeks to exemplify a unique conception of wholeness composed of an 'integrated voice.'

[7] Eliade, M. e*d*. (1987) *The Encyclopedia of Religion*. New York: Macmillan Publishing Company. p. 282.

SUMMARY OF CHAPTERS

In Part I of this thesis, 'The Braid: Poetry, Science and Spirituality', I begin by considering the epistemological and ontological claims of poetry, its rights of inquiry and knowledge-making, particularly within the context of Mary Midgley's *Poetry and Science*, Veronica Forrest-Thomson's thesis *Poetry as Knowledge*, and Peter Middleton's *Physics Envy*. I then discuss poetry's abilities as a form of dialogue by introducing the various types of dialogue in poetry through an initial discussion of the 'I' and 'Thou' in Paul Celan and Martin Buber and how this links to social 'atomism.' From there, I establish the historical 'Margins of Conflict' within the scope of this thesis's research concerns, defining and differentiating the terms 'science' and 'scientism.' The subsequent discussion of 'Poetry & Mind' examines poetry's fitness to represent inner experience. This leads into a definition of 'spirituality' before moving onto differentiation between 'spirituality' and 'religion.' 'Further Considerations: Poetry & the Soul' engages with Daniel Tiffany's *Toy Medium,* particularly his discussion of materialism and lyric, within the context of Midgley's critique of Descartes and his ideas of the soul and mind as substance. This chapter also explores Adam Frank's *The Constant Fire*, which defines the 'fire' as a shared aspiration between science and the sacred, along with other contexts of this 'fire' within poetry and personal experience. Remaining discussion examines the essential differences between science and poetry, as well as what they share, and, ultimately what this 'chord of three strands' can accomplish when brought together when poetry and science are joined to spirituality.

Closing out the Part I is a particular focus on American letters, and the life and poetry of Emily Dickinson. Here I examine how Dickinson's work manages the pressures of inner and outer experience, science and faith, and how poetry can

simultaneously contain multiple perspectives. During my discussion of Dickinson, I place her within the history of science at that time in the US, as well as discuss her context within Transcendentalism, briefly addressing the intersection of Romanticism and Transcendentalism.

Part II, 'Opening the Stone's Door', brings into discussion particular poems by contemporary poets that display the possibilities for dialogue between science and spiritual ideas within their work. First introduced is the idea of new myth-making and redefining spiritual concepts using science imagery, discoveries, and contexts. Pulitzer Prize-winning American poet Tracy K. Smith redefines the image of God both in terms of astronomical imagery and pop culture, whilst God and angels are reinvented by Pattiann Rogers in terms of cosmology, the natural world, and atomic physics. Miroslav Holub redefines both angels and the soul in material terms more akin to biology and chemistry.

Following the above is an examination of how poetry can 'quantify the unquantifiable' by employing ratios of meaning to measure experience, primarily engaging with poems of Smith, Rogers and Holub, but with the addition of Albert Goldbarth and Nadya Eisenberg. The different ways that science and poetry 'quantify' are explored here, as well as the question of whether methods of science, in particular modern physics, are sufficient to examine the entirety of reality. Possibilities of how the poem may function as a poet's 'laboratory' via the poet's use of language to hypothesise, measure, and experiment are explored here, as well as how a poem may capture something in language that may not otherwise be measured.

Lastly, poems that 'reconcile the lived experience' against the knowledge bodies of empirical fact are analysed for their contribution of the questioning and experiencing subjective viewpoint. I begin by discussing the phenomenon of 'qualia'

and linking its hesitant and debated acceptance into the scientific community to the larger concerns of personal experience, inner life, and belief. Further exploration of how poetry handles uncertainty and mystery, whilst also comprising clarity and precision, demonstrate its capacity for dialogue between science and spiritual ideas. Through analysis of Alison Hawthorne Deming's poetry in particular, I refute the notion that questioning science's authority over all aspects of reality equates rejection of science. The chapter closes with consideration of 'transformative seeing' and the significance of poetic imagination to scientists' ideas of the sacred.

Part III, 'The Braid and the Stones', focuses on the body of work I have created alongside this contextualising thesis, the poetry collection entitled *Twelve Foundation Stones of the New Heaven*. I first address the intersection of Voice & Dialogue, consulting T.S. Eliot's *The Three Voices of Poetry* and discussions of voice by Michael Wilson and David Swann (*Poetry and Voice: A Book of Essays*, 2012, Cambridge Scholars Publishing), also returning to James K. Lyon's discussion of Celan and Buber within the context of Mikhail Bakhtin's theories of dialogism and heteroglossia. I use these to frame my examination of voice, including the 'integrated voice' and possible tensions created by use of either a unified voice or various voices, within *Twelve Foundation Stones of the New Heaven*, discussing specific poems within the collection. Via this discussion of voice, I lead into my address of sectioning and arrangement within the collection, including the antiphonic effects of sectioning and sequencing. I then discuss Metaphor & Methodology, Experiment, particularly addressing the use of prose-poems within the series, and Image as Axiom: Observation & Hypothesis, with each section developed in terms of specific formal, technical and rhetorical decisions made in my poems, tying them to the overall concerns of the research.

An appendix has been added to the thesis, after the extensive reference list, in which all poems by poets, outside of my own work, in Part II have been added for ease of reference. Whilst in the thesis itself, the poems are still given their original sources in the footnotes, in the added appendix they are placed in order of their mention within the thesis.

## Part I

## The Braid: Poetry, Science and Spirituality

### POETRY, KNOWLEDGE & INQUIRY

> The longing we feel for understanding, the aspiration driving science and spiritual endeavour, will never be satisfied by an equation written on a page or a proscription encoded in scripture. Our search for truth…is a living thing. Sometimes, perhaps, we gain of glimpse of its totality in…poetry.
>
> -Adam Frank, *The Constant Fire*

While the methods and purposes that form the bodies of knowledge and methods of inquiry we call science, spirituality, and poetry are all very different, according to their nature, a common origin or source for these is the reaching out towards knowing, the question, the search for understanding. Epistemological and ontological questions saturate all three areas, with varying ends in terms of their claims to knowledge. For the poet, there is also the exploration of meaning: how one observes, evaluates and makes sense of not just the worlds they encounter, such as with Dickinson and Whitman, but also the experiences of those encounters themselves. This is the ongoing experiment of meaning in poetry.

Veronica Forrest-Thomson (1971), in her landmark thesis *Poetry and Knowledge*, considers poems that draw upon, for their imagery, 'words…from some already articulated linguistic system' such as that of 'science, philosophy, or theology'[8] which may carry with them that system's already existent claims of knowledge. The new system of meaning in a poem created via its structure and the new image itself therefore introduces the issue of whether the epistemological authority of words' original contexts are undermined by this new meaning. Though

[8] Forrest-Thomson, V. (1971) P*oetry as Knowledge: The Use of Science by Twentieth-Century Poets*. Thesis, (PhD). Girton College, Cambridge (Cambridge University). p. 3.

Forrest-Thomson explores the various critical and linguistic theory surrounding this question, introducing helpful discussion of metaphor, particularly. However, her evaluation of the 'statement' in poetry and its epistemological value is, in the end, rather limiting:

> …the epistemological status of a statement in poetry does not depend on its correspondence with non-linguistic (by which she means the external world) reality; [but]…the knowledge exhibited in a poem is a knowledge of certain forms of language and ways in which they can be brought together.[9]

The reduction of epistemological authority for poetry is certainly useful for her study, as it helps limit outside factors, some of which that the author acknowledges she is unqualified to engage with[10] or that do not concern directly the scope of the theories she discusses. However, this limitation places the original '"truth-content" of a term' out of relevance, and focuses significance solely on the poem's structure and the 'form in which the claim to knowledge is put forward', not the knowledge itself.[11]

Certainly the structure of a poem, and its interweaving combinations of language, particularly from various sources such as science and theology (or spirituality), and hence the new meanings generated by combinations of language systems, are of extraordinary interest and relevant parts of how a poem functions to create new knowledge. These aspects of poems are considered amongst the approaches of my present research. But the elimination of external referents, or the 'non-linguistic world,' as well as the elimination of various elements of experience surrounding a poem, veers us away from the needed combination of inner and outer viewpoints that will contribute to poetry's ability concerning dialogue, which contributes towards a renewed unity and wholeness of perspective. Additionally, as

[9] Forrest-Thomson, p. 6.
[10] Ibid, p. 7.
[11] Ibid, p. 6.

Forrest-Thomson concedes, linguistic systems may not be the entirety of poetry's epistemological claim, asserting it is possible 'that the significance of words in their original contexts may imply consideration, as evidence, of non-linguistic elements or experience,' and she is not necessarily 'contending that poetry does not provide any experience other than that of the relation between verbal contexts'— simply for her purposes, they are not relevant. For this present research, however, the experience of a poem (yet not a poem separated from the verbal contexts), and the representation of experience within a poem, and the meanings inherent in external referents are relevant in a significant way: a poem that explores the concepts and ideas of science within the context of human experience can provide an opening for the often fraught and divided areas of thought and feeling, an opportunity for dialogue with the spiritual, the soul, the unabridged self.

### POETRY & SCIENCE

Science at first may not appear to be the typical domain of the poet, yet there exists an evident literary lineage displaying quite the opposite. Within American letters, which is the primary context of this thesis, there is a distinct precedent of consistent engagement with science as a poetic tradition. From the point of Dickinson and Whitman's emergence as the forefront poets of a new poetic tradition within the Transcendentalist period, through to the rise of physics and its substantial impact on late-Modern poets (when pressures to justify the significance of poetry were especially intense in the United States post-war, a war won by physical sciences),[12] science saturated the creative and intellectual landscapes of the nineteenth and twentieth centuries. Peter Middleton considers the impact of science on the writing of American poetry in his book *Physics Envy* (2015), which is 'primarily devoted to

[12] Middleton, P. (2015) *Physics Envy: American Poetry and Science in the Cold War and After*. London: The University of Chicago Press. p. 18.

Cold War poets who…wanted to claim a right of experiment and inquiry for poetry.'[13] Middleton analyses the conceptual schemes and experiments in the poetry of Muriel Rukeyser, Charles Olson, and also more contemporarily the work of Rae Armantrout and Robert Duncan, amongst others less centrally, considering the way these poets have approached this right of inquiry through their experiments with form and scientific methodology.

Though the poets of Middleton's focus are not simply objecting, as early Idealists were, to the Materialist assertion that true knowledge must only be empirical, due to physics' displacement of materiality as a sensible phenomenon, they each in turn were still objecting to science possessing the only ontological truths, as well as the only proper epistemological methods.[14] Logical positivists of the time, such as Reichenbach (1951), 'dismissed any knowledge claim that did not arise directly from *scientific study* of the material world'[15] (emphasis mine) and the idea that 'scientific thought has become the pattern for creativity in our age' (Waddington, 1941 in Middleton, 2015) had been perpetuating since near the beginning of the Second World War. The contemporary poets that my own research includes also display, through the ideas, experiments, and linguistic choices expressed in their poems, a continued challenge to science's perceived final assertion of authority over knowledge and experience, addressed in particular in Part II of this thesis.

As precursor to the Transcendentalist era out of which Dickinson and Whitman erupted, certainly noteworthy are the Romantic poets of the British tradition writing historically in the lead up to their emergence. Transcendentalists, though they

[13] Middleton, p. 2.
[14] Ibid., p. 4.
[15] Ibid., p.4.

grew up reading John Locke, objected to Lockeian thought.[16] Alongside Newton (1687), the Age of Reason was largely launched by the ideas of Locke's proposals that true knowledge must be verified by empiricism, in *An Essay Concerning Human Understanding* (1689). Similarly to Transcendentalism, Romanticism idealised the power of the individual, and favoured subjective human experience and perception over objective reality, believing also in 'the metaphysical or spiritual nature of reality.'[17] They contended with rationalism, which asserted that truth could be found by logic and reason foremost, and was not limited by the sense experience.[18] Romantics 'believed that emotion and the senses could lead to higher truths than either reason or intellect.'[19] So like the Transcendentalists, the Romantics believed there was something more than objective reality, however unlike them, they favoured sensory experience. Either way, they both disputed notion of materialism that *only* the physical was reality—for both perspectives, there was something beyond it.

William Wordsworth, regarded as one of the first generation of Romantic poets,[20] in considering the question of whether poetry could deal with the physical sciences, proposes that an author would, as Midgley relates,

> …have to be someone for whom the details of science *are as familiar and as palpably material* as the topics with which poetry normally deals – topics which are mainly concerned with central human emotions and with the world as we directly perceive it.[21]

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[16] Myerson, et al, p. xxiv.
[17] Ladd, A., Meyers, K., Philips, J. and Anesko, M. (2010) *Romanticism and Transcendentalism (1800-1860)*. New York: Chelsea House Publishers. p. 4-5.
[18] Markie, P. (2015) 'Rationalism vs. Empiricism.' [online] *The Stanford Encyclopedia of Philosophy.* (Summer 2015 Edition). Zalta, E.N. *Ed*. Available at: https://plato.stanford.edu/archives/sum2015/entries/rationalism-empiricism/ [Last Accessed: 01 Jan. 2017]
[19] Ladd, et al, p. 5.
[20] Wordsworth, J. and J., eds. (2006) *The Penguin Book of Romantic Poetry*. [ebook] London: Penguin Books. (Introduction: No page numbers)
[21] Midgley, p. 76.

Wordsworth also advocated, in a passage directly quoted by Midgley, the poet 'carrying sensation into the midst of the objects of science,'[22] which ties the subjective and objective perspectives together, an important matter for this exploration. Midgley goes on to tease apart the difficulties of Wordsworth's perspective, namely that it would be near impossible for most poets to become this familiar with any branch of science, and also that for those remote discoveries of science, such as quarks or electrons, 'sensation' could 'scarcely' be brought into their midst.[23] What Midgley goes on to advocate, however, are 'the "general indirect effects" of the sciences – the interface between them and ordinary life' which 'is a topic available to us all.'[24] The common denominator is that of human experience, whether directly experienced with the senses or indirectly so, examined by the consciousness alongside the felt emotions of life.

### Poetry as Dialogue

Poems, as part of their character, are places of dialogue: dialogue between the self and the self, dialogue between the poet and the reader, dialogue between the poet and the larger world. In James K. Lyon's (1971) examination of the parallels between the mid-to-late twentieth poetry of German-language poet Paul Celan and the philosophy of dialogue by Austrian-born Israeli Jewish philosopher Martin Buber, poetry's very nature as dialogue in very similar varieties to these are explicated.[25] From the perspective of Buber's philosophy, the self is in isolation inside of objective experience, and one must escape this isolation via an encounter with an other—through some sort of dialogue with someone else. Lyon elaborates:

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[22] Midgley., p. 76.
[23] Ibid., p. 76.
[24] Ibid., p. 77.
[25] Lyon, J.K. (1971) Paul Celan and Martin Buber: Poetry as Dialogue. *PMLA*. Vol. 86, No. 1, p. 110-120.

> For Buber the way out is essentially an artistic one, since one transforms the 'Es-Welt' (It-world) of external experience and things (*Erfahrung*, *Gebrauchen*) into a 'Du-Welt' (*Thou-world*) of almost mystical contact (*Beziehung*) through the act of speech.[26]

Lyon then explains that Celan 'shares Buber's view of man's isolation,' demonstrating this through the majority of his poems, which 'focus on the act of poetic speech as the only meaningful way out of this condition.'[27] Celan sees language's essence as that of dialogue[28], and he perceives that a 'poem…is directed at someone or something in an attempt to meet this Thou, this "other reality."'[29] Nor is this limited to an external 'Thou,' as Lyon explains, but as is the case with Celan's poetry, 'the poet's objectified self...enters into a dialogue with the newly discovered "larger" aspect of self.'[30]

Midgley, too, recognises this isolated sense of the self, but sees it as a direct result of social atomism[31] and the notion of consciousness as a peculiar, separate substance from the rest of our reality—and hence, a good part of our current suffering as beings with a divided self. As Midgley elaborates, 'This approach conceives of minds—or consciousness—unrealistically as self-contained, isolated from the world around them.' She advises us that to stay in this mistaken place, 'Descartes' wrong place,' also that to which Bertrand Russell was wedded, would be 'terminally solipsistic.' For Midgley, this isolation is essentially illusory, untrue to the realities of consciousness and how it arises out of our connection to others, and to avoid this isolation we must focus on 'our own experience and its relation with that of others

[26] Lyon, p. 110.
[27] Ibid., p. 110.
[28] Ibid., p. 111.
[29] Ibid., p. 111.
[30] Ibid., p. 113.
[31] Midgley, p. 3.

familiar to us.'[32] The experiential dialogue with others, the relating to others, is key. Similarly, Midgley asserts that the answer to ending isolation, and to solving the narrowness of the viewpoint that it brings, is language:

> For humans at least…the whole use of language depends on, and arises out of, the deep, innate, unshiftable sense that each of us is only one among others who experience the world in roughly the same sort of way that we do ourselves.[33]

Indeed, this language also exists and arises to communicate those experiences to other selves around us, the 'Thou'. Language does not arise in a vacuum, in isolation, either. Its purposes are dialogue and communication, yet it is also through the articulation of thoughts and feelings to others in a shared language that we ourselves become conscious of them.[34] Perhaps in this way she echoes what Lyon has to say about Celan and Buber: 'For them both, this meeting of man and…a Thou, leads to one's realisation of the self.'[35] In either sense, it is clear that poetry, as language and as communication, possesses an innate function of dialogue—one necessary to examining the questions of consciousness brought about within that interface between science and our lived experience. Further discussion of the notions of 'I' and 'Thou' occurs under considerations of voice in Part III.

## MARGINS OF CONFLICT

Amongst the areas of conflict around this braid of science, poetry, and spirituality already mentioned—those of mind and body, thought and feeling, reason and intuition, Materialism and Idealism, subjectivity and objectivity, spiritual and scientific—revolves a lot of confusion about what side is what. Often it is easily assumed that science and empiricism has always been at war with theological beliefs.

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[32] Midgley, p. 117-118.
[33] Ibid., p. 126.
[34] Ibid., p. 97.
[35] Lyon, p. 111.

However, during the seventeenth century, as Midgley points out, Francis Bacon, 'arch-populariser and cultural hero'[36] of the modern science movement, and:

> …the men of the Royal Society had not the slightest wish to attack Orthodox Christianity. They were mostly devout men who saw their science as closely allied with the Church in resisting unorthodox thinkers.[37]

It was not until later, during the Enlightenment period of the nineteenth century when Christianity was then named as the primary enemy of science.[38] And though now the argument has been reframed as the 'two cultures war'[39] between science and the humanities, the 'anti-religious pattern still persists.'[40] This, despite the fact that areas of study classified currently within the humanities, such as history and philosophy, were previously considered allies to science. No less an issue would be the fact that at different points of history, science very clearly meant different things. 'The 'science' [of Bacon's reign] that excluded Kepler's doctrine of gravitation and enthusiastically accepted theism cannot be the same thing as today's science which reverse those positions.'

Bacon's notorious language regarding science, expressing in no uncertain terms the need to conquer and subdue Nature, primarily personified as female, and to torture answers from her and occupy her by violent conquest, formed in great part later conceptions of science.[41] Worth revisiting is the placing of nature into slavery's alignment with God's purpose and theism of the age. Additionally, language saturated with hostile imagery, as with Bacon, despite its emotional charge, was 'counted as

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[36] Midgley, p. 56.
[37] Ibid., p. 65-66.
[38] Ibid., p. 66.
[39] In 1959, C.P. Snow delivered his titular lecture dividing 'the intellectual life of the whole of western society' into two cultures – that of science and the humanities, with poetry firmly placed into the latter.
[40] Midgley, p. 66.
[41] Midgley, p. 56.

scientific, and therefore belonging to the language of reason, while affectionate and respectful imagery…was dismissed as mere sentiment.'[42] This had a longstanding impact on what sort of language was considered scientific – so that even today, any positive emotion is quickly dismissed, even mocked, whilst language of hostility is easily accepted. Not surprisingly, this lead to 'an attitude of fear and contempt for the imagination and for ordinary human feeling.'[43] And even less surprisingly poets, to whom nature was a valuable source of inspiration, even spirituality, and to whom human feeling was tantamount, were quite ready to challenge the prevalent scientific attitude.

It might seem absurd amongst these tangled strands, then, to assert that certain poems may embody the possibility for dialogue between such historically fraught categories of thought as science and spirituality. Certainly, not all poems do this, nor do all poems even attempt to do this. But this research will explore poems that, through combining and exploring scientific concepts, ideas, and themes with the varieties of human experience, reach toward a place of spiritual questioning, the seat of the soul, perhaps even some shared understanding. This is done through the creation of a poetics of spirituality—open, responsive, permeable—meeting with the methods, eyes, and concepts of science: an encounter between the inner soul and the outside world, via language, inquiry, and imagery.

However, in finding our way to how a poem may *do this thing*, several important terms must be further clarified. For in close examination, one might find that science and spirituality are not so far divided after all, but instead, are certain concepts aligned to them, despite their differences.

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[42] Ibid., p. 61.
[43] Ibid., p. 67.

## DEFINING SCIENCE & DIFFERENTIATION FROM SCIENTISM

Defining 'science' as a term and concept may initially appear simple, yet once one looks into the depth of history, philosophy, and various branches surrounding the central notion, this simplicity easily disperses. The Oxford English Dictionary defines 'science' as, 'The intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment.' This seems clear enough, and speaks to the methodologies a scientist might undertake in their study, most notably, and customarily, observation and experiment, those key characteristics of the scientific method. But one must proceed further than a dictionary definition for true understanding of any concept of such depth. As David C. Lindberg (2008) acknowledges, a dictionary definition is 'so general as to be of little help.'[44]

While the focus of Lindberg's writing is on the early European roots of science from the pre-Socratic period through late-Medieval scholarship, his discussion of what 'science' means is valid, here. He reiterates that the search for a single definition of sciences is surprisingly elusive. Is it simply knowledge of the material world that has been systematised? Or must there be division between theoretical knowledge and its application? Alternatively, should only the applied use of experimental method executed via a series of rigorously defined steps, resulting in repeated and observable evidence, be the sole signifier?[45] And where does that leave theoretical physics?

Lindberg concedes that, 'for many people—scientists and general public alike—true science is defined simply by its content—the current teachings of physics,

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[44] Lindberg, D.C. (2008) *The Beginnings of Western Science: The European Scientific Tradition In Philosophical, Religious, And Institutional Context, Prehistory To A.D. 1450*. 2nd ed. London: University of Chicago Press, Ltd. p. 1.
[45] Lindberg, p. 1.

chemistry, biology, geology, anthropology, psychology, and so forth.'[46] Beyond this matter of content, however, is the issue that each meaning of science that has been acceptable by any substantial grouping of individuals, particularly practitioners or academics, becomes convention by these groups that they are 'unlikely to relinquish…without a fight.'[47] The conclusion arises that, while science may include some balance of these characteristics, one must continuously accept the diversity of meanings and proceed to determine what is meant from the context.

Midgley addresses an ambiguity of the term 'scientific' that would be well worth noting: it 'now has two distinct meanings,'[48] both of which cause confusion about what sort of praiseful notion is being doled out when something is called 'scientific':

> On the one hand it can be a quite general word of praise, meaning simply thorough and methodical as apposed to casual, vague or amateurish…On the other hand, the word can be a strictly factual one meaning 'concerned with the natural sciences' as opposed to other studies…This is not a trivial ambiguity…When the two meanings get mixed, it seems obvious by definition that the methods of natural sciences are not just the best methods but the only ones that are intellectually respectable at all.[49]

It would appear that the general difficulty of science's manifold meanings, as well as the possessive monopoly over the 'correct' idea of science, both underwrite the actual source conflict, that of scientism.

Barbara Herrnstein Smith (2009), in her book *Natural Reflections: Human Cognition at the Nexus of Science and Religion*, defines 'scientism' thusly:

> ...it is not equivalent to the valuing of empiricism, systematicity, or logical rigor in the pursuit of knowledge or to a generally appreciative view of the activities and achievements of Western Science. Rather it

[46] Ibid., p. 2.
[47] Ibid., p. 2.
[48] Midgley, p. 200.
[49] Ibid., p. 200-201.

> refers to the conviction[50], that the aims, methods, and products of the natural sciences should be taken as models for all knowledge practices—a conviction often attended (as in Wilson's book) with the idea that the humanities disciplines are at best pre-scientific and should be shepherded as quickly as possible, along with some still vagrant social sciences, into the fold of the natural sciences.[51]

Even prior to this, and E.O. Wilson's pivotal examination of the term, Mexican poet Octavio Paz (1991) expressed his concerns about scientism, making clear that each area of science should indeed 'speak with authority with regard to its particular domain.'[52] Paz also asserts that there is 'no such thing as Science; there are only sciences,' which, as will be demonstrated by my own inclusion of a broader definition of science for my own uses, I disagree with. However, his differentiation of science from scientism is important, and foreshadows Wilson and Herrnstein Smith's concerns: 'But scientism would translate the discourse of physics, chemistry, or biology into human domains: history, society, the individual, the passions.' Paz of course believes that by doing so, by applying only the methods and discourse of science to the human passions and the study thereof, we lose a great deal—in fact, 'the cost is immense.' Just as 'Keats and the other romantic poets who protested against the dominant mechanistic ideology' of their time 'were not being irresponsible and insensitive to the beauties of science,'[53] neither are Paz, Herrnstein Smith, or I aiming against the inherent vales or beauty of science, nor 'an objection to the actual discovery of facts about the world,'[54] but scientistic notions of 'omnicompetence' that

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[50] As Herrnstein Smith states in this passage, she pulls this definition from the original and iconic articulation of Edward O. Wilson in *Consilience: The Unity of Knowledge*, his book published in 1998.
[51] Herrnstein Smith, B. (2009) *Natural Reflections: Human Cognition at the Nexus of Science and Religion*. New Haven, Connecticut: Yale University Press. p. 31-32.
[52] Paz, O. (1991). *The Other Voice: Essays on Modern Poetry*. Trans. Helen Lane. New York: Harcourt Brace Jovanovich. p. 104.
[53] Midgley, p. 63.
[54] Ibid., p. 2

disregard all other forms of thought.[55] This term is supplied by the chemist Peter Atkins (1995), whose words Midgley brings into her discussion of this problem. He expresses an extraordinary contempt for poetry, philosophy, and theology, praising the 'Limitless Power of Science' (from his article's title) and disparaging the 'obfuscation' and 'titillation' provided by these other forms of thought, declaring they contribute nothing to understanding of the universe. While, as Midgley acknowledges, these are unusually forthright expressions, the view they communicate 'is actually not a rare one.'[56]

Middleton acknowledges that mid-twentieth-century 'poets faced a dilemma' because 'Scientists owned the natural world'[57] and 'psychophysical reductionism was in the ascendant…The material world revealed by science was all there was; true knowledge was scientific knowledge.'[58] Middleton, however, pursued literary theory as a location to discover poetic methodology that engaged with science for the purposes of his study. He found that it had little to offer, and proposes two reasons for this. One is that 'literary theory has not fully recognised the diversity, messiness, and incompleteness of actual scientific practice.'[59] Elaborating upon the second, he refers to Paisley Livingston (1988), who feels that literary theorists, because they 'have distorted images of what science actually does,' 'think science always claims it is the only path to truth.' Middleton asserts, however, that

> In practice, many scientists, as well as philosophers of science, now argue that, in John Dupre's words, 'there are surely paths to knowledge very different from those currently sanctioned by the leading scientific academies.'[60]

[55] Ibid. p. 27.
[56] Ibid., p. 28.
[57] Middleton, p. 17.
[58] Ibid., p. 4.
[59] Middleton, p. 24.
[60] Ibid., p. 25.

Even if voices such as that of Peter Atkins are hopefully becoming the minority, the ideology of scientism retains its influence and is still incredibly impactful and prevalent. And certainly there are those, such as Atkins, who would propose a more elegant world of scientific practice than the genuine face of methodology that Middleton references.

Poet and editor Kurt Brown (1998), in his introduction to *Verse and Universe: Poems About Science and Mathematics*, defines science as:

> …the pure study of the universe and all it contains for the sake of knowledge and understanding alone, (keeping in mind the Latin root of the word *scire*, to know.[61]

Within the body of my work, this broader understanding of science is primary, while the practices of science will be more clearly referred to when discussing more pragmatic elements of scientific process, or areas of study expanded upon when discussing specific fields and specialities. However, going forward certain practical methods of science, including observation and experiment, formation of hypothesis and theory, as well as adaptation of rigor are understood to be a part of poetry's engagement with science and exploration of knowing. Helpful, too, are the methods of physicists that Middleton details on Physics Envy, those of 'constructing speculative analogies, images, and conceptual frameworks in order to understand the empirical and nomological features of this invisible yet material world.'[62]

## POETRY & MIND

What Paz calls scientism equates fairly closely to what Marilynne Robinson (2010), acclaimed American writer and novelist, refers to as 'parascientific literature.' Robinson defines this sort of culturally authoritative writing phenomenon as:

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[61] Brown (1998) *Verse and Universe: Poems About Science and Mathematics*. Athens & London: The University of Georgia Press. p. xiii.
[62] Middleton, p. 46.

> …a robust, and surprisingly conventional, genre of social or political theory or anthropology that makes its case by proceeding, using the science of the moment, from a genesis of human nature in primordial life to a set of general conclusions about what our nature is and must be.[63]

This sort of popular science-based prose asserts the final word on everything, rather unscientifically as Robinson points out,[64] via its 'confidence that science has given us sufficient knowledge to allow us to answer certain essential questions about the nature of reality, if only by dismissing them.'

And dismiss them it often does. Though both Paz and Smith's definitions are focused on fields of scholarly study, Robinson sees the effects of parascientific literature as reaching farther afield. This is because what parascientific literature dismisses is not just 'certain questions' about the nature of reality, but one very important way of perceiving reality altogether: the personal experience, the soul's walk in life, 'the felt life of the mind.'[65]

Much like the attitude (per Smith, via Wilson) that the humanities are some less-developed prescientific mode of thought, Robinson proposes that 'the core assumption that remains unchallenged and unquestioned' within this system of parascientific thought 'is that the experience and testimony of the individual mind is to be explained away, excluded from consideration when any rational account is made of the nature of human being and of being altogether.'[66]

This 'exclusion of the felt life of the mind from…accounts of reality' proposed by parascientific literature, which unfortunately does permeate and influence a great deal of cultural and scholarly thought, damages the validity of

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[63] Robinson, M. (2010) *Absence of Mind: The Dispelling of Inwardness from the Modern Myth of the Self*. New Haven & London: Yale University Press.
[64] Robinson, p. 50.
[65] Ibid., p. 35.
[66] Robinson, p. 22.

personal expression as well as the value of spiritual endeavour. What's more, this divisive notion is a primary impediment to dialogue between different ways of knowing. It simply says the other ways do not exist, and that is that.

Poetry, as a way of processing experience as well as exploring the possibilities of knowledge and language, has a wide-ranging arc. This arc, importantly, is one that patently includes 'the self, the solitary, perceiving and interpreting locus of anything that can be called experience.'[67] And therefore, poetry exists in a very necessary position to value 'the beauty and strangeness of the individual soul, that is, of the world perceived in the course of a human life, of the mind as it exists in time.'[68] This research explores the connections between the enterprises of poetry, science, and spirituality, in order to reveal how important this locus is—the individual soul as the unifying location that originates each one of these endeavours. Additionally, this research considers how poetry can 'claim a right of experiment and inquiry'[69] in the formation of knowledge, both scientifically and spiritually.

### Defining Spirituality

Approaching an exact definition of spirituality appears at least equally, if not more, challenging than for science. As Midgley states, terms with 'various possible meanings, arising from different contexts of use' must be 'disentangled'[70] depending on their use. Whilst here she is referring to troublesome words often used in differing areas of science as well as commonplace application, such as time, space, evolution, and infinity, she goes on to say that clarifying 'concepts that are used mainly from the subjective viewpoint,' such as consciousness and experience, become even more

[67] Ibid., p. 7.
[68] Ibid., p. 35.
[69] Middleton, p. 2.
[70] Midgley, p. 135.

troublesome.[71] Though a term such as 'spirituality' can be, and indeed has been, considered objectively (externally) as a component of broader studies in religion, there is inevitably a subjective element to it, as both consciousness and experience come directly into consideration for the spiritual individual. However, in order to 'disentangle' spirituality somewhat, let us consider several key definitions of the term.

Giselle Vincett and Linda Woodhead commence their approach towards the word 'spirituality' with due caution of its difficulties, saying the term 'needs be handled with care,' due to its 'long history, a wide range of meanings' and 'application to many very different phenomena.'[72] Much of the chapter on the subject, after some initial discussion of common characteristics, in fact does focus more upon varieties of modern *spiritualities*, in plural, meaning specifically defined practices falling under spiritual 'religions'. However, there are several aspects to this important term 'spirituality' that remain relevant here and going forward, discussed within these common characteristics.

One important factor to consider is the usage of the term that Vincett and Woodhead acknowledge '[f]rom the mid-nineteenth century onwards,'

> …by those invested in it to draw a contrast between 'religion,' understood as something external and dogmatic, and 'spirituality', understood as a preferable alternative.[73]

The authors state that in this chapter they avoid taking such sides. For my purposes, as further clarified later in this chapter, I may appear to be taking sides myself. Nonetheless, as with much of my argument throughout this research, I prefer to advocate a middle way between the extremes, by examining what will be worth

[71] Ibid., p. 135.
[72] Vincett, G. and Woodhead, L. 'Spirituality.' (2016) In: Woodhead, L., Partridge, C.H., and Kawanami, H. *Eds. Religions in the Modern World: Traditions and Transformations*. London: Routledge. p. 324.
[73] Vincett and Woodhead, p. 324.

carrying forward from both perspectives. I do acknowledge the difficulties of religion I would like to steer away from are those that fall under external and dogmatic. But first I would like to consider what about spirituality that opposes this might make it a legitimately better alternative in some respects, before revisiting religion.

As the authors state, whilst spirituality was at first a response specifically to forms of Christianity, it spread throughout the world thereafter, with a primary and 'pioneering feature of modern spirituality'—that of 'openness to other religions—particularly their mystical aspects.'[74] A bulleted list of other features characteristic across the variations of spirituality provides further detail. These include 'loose networks of association' rather than official congregations, promotion of embodied techniques such as yoga and meditation, and 'a tendency to embrace "progressive" and "anti-establishment" causes.'[75] However, the significant features worth highlighting for this research are the following: 'a universalistic…emphasis…on the interconnectedness of things, both the "whole" human and the "whole" universe'; 'value placed on "seeking" and an open and tolerant attitude towards other spiritual "paths"'; and, 'an emphasis on the importance and authority of inner, subjective experience.' Vincett and Woodhead are also sure to clarify that, in their context, the element of individualism that does characterise this spirituality is not a focus on the self over others, but instead that individuals must decide within their own minds how to live their lives and what to believe.

Woodhead, in *The Spiritual Revolution: Why Religion is Giving Way to Spirituality* (2005), joins Paul Heelas in a deeply researched study of spirituality, testing through specific communities whether or not there genuinely is a 'spiritual revolution' occurring in which traditional religions are being displaced by modern

[74] Ibid., p. 234.
[75] Vincett and Woodhead, p. 234.

spiritualities. They reference what Charles Taylor (1991) 'calls the massive subjective turn of modern culture,'[76] explaining that what qualifies this change in observed populations is

> …a turn away from life lived in terms of external or 'objective' roles, duties, and obligations, and a turn towards life lived by reference to one's own subjective experiences (relational as much as individualistic).[77]

These include the sort of religious roles previously committed to by members of religious communities and belief systems under the deference to a higher authority, such as God or the church, that would have previously been more common prior to the shift. The authors use the term 'life-as' to refer to the previous religious role, differentiating this from the new notion of 'subjective-life', 'life lived in deep connection with the unique experiences of my self-in-relation.'[78]

Heelas and Woodhead employ this language of 'life-as' and 'subjective-life' to draw a sharp distinction between religion and spirituality. They classify religion as 'life-as', stating that religion 'sacralises' this mode, 'subordinating subject life to… "higher authority"', whilst spirituality becomes the 'subjective-life' mode, which 'invokes the sacred in the cultivation of unique subjective life.'[79] It does not at first appear that their designations permit any in-between, or potential bleed-over, as the definitions drawn from Vincett and Woodhead appear to take into account. Heelas and Woodhead do

> …stress that the definition [they] use in this volume between 'subjective-life spirituality' and 'life-as religion' is not always identical with the ways in which the terms 'spirituality' and 'religion' are used in culture.[80]

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[76] Heelas, P. and Woodhead, L. (2005) *The Spiritual Revolution: Why Religion is Giving Way to Spirituality*. Oxford: Blackwell Publishing. p. 2.
[77] Heelas and Woodhead, p. 2.
[78] Heelas and Woodhead, p. 3.
[79] Ibid., p. 4.
[80] Ibid., p. 5.

The authors go on to consider other various usages of the term, acknowledging that whilst some more common usages align more closely with their categories, such as spirituality that is meant to 'express commitment to a deep truth that is found within what belongs to this world', and religion that is meant to 'express commitment to a higher truth that is "out there", lying beyond what this world has to offer, and exclusively related to specific externals'[81], others defy the arbitrary division they have established. One such example given is within Christianity, where spirituality is used 'to express devotion to God' and 'an intense relationship…with the divine.'[82] This exception is worth noting because this instance involves both the subjective (inner) and objective (outer) senses—'subjective in the sense that it involves often intense experiences', but 'objective in the senses that it is focused on something which remains external to and higher than the self'[83]. While the modes Heelas and Woodhead have chosen to define within *The Spiritual Revolution* prove effective as classifiers for their empirical study of the spiritual and religious communities of Kendal, the application of these strict divisions for broader understanding would at least initially appear limited.

However, the authors do prise these narrow classifications open to make a helpful clarification. They explain that whilst there is an important and central focus on the uniqueness of the self within this subjectivization, this is not meant to be 'self-centred', and 'should not be confused with individualization.'[84] Additionally, whilst the personal experience of the individual is 'their source of meaning, significance, and authority,' this does not also mean that the individual will then behave in an

[81] Ibid., p. 6.
[82] Ibid., p. 5.
[83] Heelas and Woodhead, p. 5.
[84] Ibid., p. 11.

'atomistic, discrete or selfish' manner.[85] For most of all, as their study reveals, the spirituality of 'subjective-life' is holistic, a matter of 'self-in-relation rather than a self-in-isolation'—what Carson McCullers (1973) calls 'the "we-of-me"'.[86] This subjective-life spirituality, then, also coincides with Midgley's rejection of social atomism as well as Buber and Celan's encounter with the 'Thou' as spiritual dialogue essential to realisation of the self.

In *A Brief History of Spirituality*[87], Philip Sheldrake laments the 'sharp and unhelpful distinction' between religion and spirituality, along with spirituality's division from 'its roots in Christianity.' However, he does concede that the term 'refers to the deepest values and meanings by which people seek to live,' and 'implies some kind of vision of the human spirit and of what will assist it to achieve full potential.'[88] What I find most interesting in Sheldrake's discussions, however useful these earlier elaborations on the term may be, is

> …that 'spirit' and 'spiritual' are not the opposite of 'physical' or 'material' (Greek *soma*, Latin *corpus*) but of 'flesh' (Greek *sarx*, Latin *caro*) in the sense of everything contrary to the Spirit of God. The intended contrast is *not therefore between body and soul but between two attitudes to life*.[89] (emphasis mine)

Instead of taking up the Cartesian division, Sheldrake's elucidation sets spirituality apart as transcendent, in the sense of above or beyond the range of normal or physical human experience, but not separated from it. Sheldrake, after further elaborating on the earlier history of the term from before the twelfth century up through the early twentieth, explains that after the Second Vatican Council of the 1960's, 'spirituality'

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[85] Ibid., p. 11.
[86] Ibid, p. 11.
[87] Sheldrake, Philip. (2007) *A Brief History of Spirituality*. Oxford: Blackwell Publishing.
[88] Sheldrake, p. 1-2.
[89] Ibid., p. 3.

increased in usage referring to studies in Christian life.[90] Though this impact is obviously most directly aligned to Christianity, there are a number of effects of the term's context here that are worth considering in our particular pursuit of an advancing definition:

> First, it countered old distinctions between a supernatural, spiritual life and a purely natural, everyday one. Second, it recovered a sense that "the spiritual life" was collective in nature rather than predominantly individual. Third, it was not limited to personal interiority but integrated all aspects of human experience. Fourth, it re-engaged with mainstream theology, not least biblical studies. Finally, it became an area of reflection that crossed the boundaries between different Christian traditions and was often a medium for ecumenical growth. By the end of the twentieth century this had extended further into the wider ecumenism of interfaith dialogue.[91]

Sheldrake's elaboration then corresponds with the final clarification of the definitions offered by Heelas and Woodhead, especially regarding the notion that spirituality is not meant to be individualistic in the isolated, selfish sense, valuing only interiority only. This picture of spirituality includes, but is not limited to, personal interiority, and whilst context would determine to the spiritual individual exactly what form the 'collective' nature would take, there is an evident interconnectedness with others (harkening back to Vincett and Woodhead). Additionally, this lack of a divide between the natural, might we even say bodily, life and spiritual life is restated from Sheldrake's earlier statement. Though point four is quite specific to biblical Christianity, the ideas in the final point and its extension also match up with the characteristics detailed by Vincett and Woodhead—that of openness to other religions, here expressed by the term 'interfaith dialogue,' and ecumenical in the sense of promoting unity.

[90] Ibid., p. 3.
[91] Ibid., p. 4.

A number of points here are central for the current purpose. Clearly definitions of spirituality have areas of conflict as well as areas of overlap. What I am after for the application of the term applies to a broader sense of the necessary recognition of consciousness, of the subjective nature of experience, but also of the connectedness of the subjective point of view to the rest of human experience, and of the world beyond it. What is necessary is a meeting between *inner* and *outer*, a combination of the subjective and objective, and, quite importantly, a suspension of polarising one perspective over the other. Though there is little to satisfy this preference so far in existing definitions, I will gather from each what applies to my context, given their variety. Going forward, when the term 'spirituality' is used in this research, it will be understood as: honouring and acknowledging the subjective, personal experience as legitimate and important, perhaps even sacred, yet valuing interconnectedness beyond the individual and inclusion of the objective – in fact an integration with the objective, as well as an acknowledgment of the necessity for other points of view. Additionally, and centrally, it will retain that very important and pivotal element: that of seeking, the reaching out towards knowing, and openness to new understandings of truth.

So whether spirituality turns out to be a 'last gasp and whimper of concern with the sacred in the West,' one that is 'doomed to disappear,' or 'a tectonic shift in the sacred landscape that will prove even more significant than the Protestant Reformation'[92] (an argument that I will leave to Heelas and Woodhead at this juncture), spirituality's emergence and substantial growth, along with its alignment to the rise in recognition of the subjective point of view, is quite significant. As Midgley points out, in recent decades, the 'problem of consciousness,' banished from recognition amongst scientists and rational thinkers for centuries, is becoming

[92] Heelas and Woodhead, p. 2.

increasingly appreciated as a real and legitimate concern in need of study.[93] Spirituality's engagement with science, via the locus of poetry, may be able to contribute to that study as an opportunity to combine the human consciousness with the objective outlook.

### DIFFERENTIATING SPIRITUALITY & RELIGION

As American astrophysicist and writer Adam Frank states in his 2009 book *The Constant Fire: Beyond the Science vs. Religion Debate*, 'Many people 'practice' a religion for a lifetime...without ever manifesting an elemental effort at understanding. I would not call this spiritual endeavour.'[94] This difference between religion and spirituality is fundamental, the difference that Frank calls 'aspiration.' Aspiration is a desire to understand, a seeking, a genuine search for knowledge through inquiry and exploration. What Frank refers to here, in terms of this kind of 'religious practice,' are those who go through the motions of attending a congregational gathering or ritually repeating behaviour without direct and immediate engagement with it, and without asking any questions. The term 'religion', and its difference to 'spirituality' in this context, is therefore important for the purposes of this research. So to further clarify my shift away from it, and towards 'spirituality' as a preferred alternative, we will now consider a few more details of this difference.

William James (1902), an imperative voice in discussion of religion and human experience[95], helpfully defines religion as:

> …the feelings, acts, and experiences of individual men in their solitude, so far as they apprehend themselves to stand in relation to whatever they may consider the divine.

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[93] Midgley, p. 12.
[94] Frank, A. (2009) *The Constant Fire: Beyond the Science vs. Religion Debate.* Berkeley, California, USA: University of California Press.
[95] James, W. (1902; 2002) *The Varieties of Religious Experience*. New York: The Modern Library. p. 36.

This definition distinguishes religion from the sense of a structured belief system, instead giving religion space to be personal, subjective. However, his definition of religion, no matter how useful, is not the only definition that springs to mind.

As Robinson points out in her book, along with her reference to James, definitions of religion, especially within the context of parascientific and related literatures, often favour a much less personal, and more negative view. She includes that of Daniel Dennett, who defined religions as 'social systems whose participants avow a belief in a supernatural agent or agents whose approval is to be sought.'[96] One might find this is the idea of religion that many have, rather than the deep and considered, and personal, experience that James explores. As Frank points out, 'For many people the word religion conjures up images of institutions of power and real estate.'[97] Due to this, and for the sake of my own work, areas of 'religious experience' in James' sense will fall under the category of 'spiritual,' whilst 'religion' and 'religious' as terms will largely fall away in order to avoid confusion with the above mentioned social systems.

Frank indeed, as his title suggests, progresses beyond debate very quickly, moving away from religion as a focus (because, as he says, 'The traditional debate between science and religion misses the point entirely'[98]), to a term akin to spirituality. He expresses concern about the term 'spiritual,' defining it as a term 'favoured by many people uncomfortable with the specific creeds of specific religions,' recalling the cautions of Vincett and Woodhead in their approach to the term's definition. Though he does, as he states, use this word on occasion throughout the book, for him as 'a scientist it has its problems, conjuring up the root term spirit as

[96] Robinson, p. 8.
[97] Frank, p. 6.
[98] Ibid., p. 9.

an eternal transcendent entity.' Clearly, in the world of scientists in their daily practice, which depends on the empirical study of the physical world, mention of an eternal or transcendent entity or soul is empirically unwelcome. Instead he chooses 'another word works better for the task ahead…the term sacred.'[99] Frank's primary focus throughout *The Constant Fire* is on human experience as a thread to tie science and 'the sacred' together.

It is worth noting that while terms such as 'spiritual' and 'sacred' are favoured and primary, and my references to spirituality and the soul won't be directly aligned with any specific religion or belief system, it is likely that my personal background as an individual raised within a Christian culture will have influence over my perspective. So whilst I acknowledge there exists an admirable diversity of religious beliefs, I am aware that when discussing my own poetry especially, these will narrow towards a Western-tradition, monotheistic background.

### Further Considerations: Poetry & The Soul

I would also like to look at what is meant by the soul, as soul and spirit are also analogous terms. Sven Birkerts, an American essayist and literary critic, explores valuable notions of the soul in his editorial 'circling' Emerson's essay 'The Poet' (2012). Here he clarifies his intentions in speaking of the soul, which I adopt into my own discussions. Birkerts says, 'To speak of soul is not, for me, to speak about religion; […] soul, for me, is prior to religion.' But he also expands on this by considering what portion of us makes up this 'soul': Birkerts believes the soul to be 'the active inner part of the self, the part not shaped by contingencies, that stands free; the part of the 'I' that recognizes the absurd fact of its being.'[100]

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[99] Ibid., p. 8.
[100] Birkerts, S. (2012) 'Emerson's "The Poet"—A Circling: Translating the transcendentalist into today's language'. [Online] Available:

What I find essential here is that soul is 'prior to religion,'the human soul as something that exists before the urge to organise it and label it, belonging to each individual. This is the soul that enters into deep communication in poetry, that which is 'prior,' that which is unlabelled. That which 'recognises the absurd fact of its being.' Birkerts goes on to say this:

> Soul, considered this way, is a quality that can be recognized in expressions of language…And the expressions most kindred, most likely—though still very rare—are poems. This is because poems are written out of a double intent: *to give voice to the most urgent and elusive inner states*, and to use language with the greatest compression and intensity. The most lasting…is the poetry that has given some expression to the poet's soul, *that part of him or herself that connects most deeply and exactly with the souls of other*s.'[101] (emphases mine)

That soul is something that may be recognised in language is significant, and even more significant is that the most likely language to do so resides in poetry. Another important detail from what Birkerts states is that the 'double intent' of poetry contributes in no small part to its ability to reveal the soul. Poetry does this by existing on the very point between the 'elusive inner states' and the outside world, with language passing through this contact point—language that connects the personal experience, the 'felt life of the mind,' with the realms of physical world and knowledge thereof.

In Daniel Tiffany's deeply fathomed exploration of the intersection of materialism and modern lyric, *Toy Medium* (2000), he discusses the concept of the 'material soul', a notion inherently linked to the atomism and materialism of Epicurus and Democritus, Descartes and La Mettrie.[102] In his establishing passages on William

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http://www.poetryfoundation.org/poetrymagazine/articles/detail/69787. [Last accessed 26 Apr 2016]

[101] Birkerts (2012).
[102] Tiffany, D. (2000) *Toy Medium: Materialism and Modern Lyric*. London: University of California Press.

Butler Yeats's 'Sailing to Byzantium,' upon which Tiffany builds his lengthy discussion of the automaton and its relevant connection to lyric poetry, atomism, and materialism, Tiffany focuses on Yeats's 'fashioning a "soul"' when he is 'Once out of nature' and gathered 'Into the artifice of eternity.'[103] This 'soul' becomes a mechanical bird 'Of hammered gold and gold enamelling.' The poet's construction of the soul into this form within the poem indicates, for Tiffany, that:

> …the soul, conventionally opposed to corporeal existence, is something the poet *makes*: the soul is an artefact. We can thus regard the lyric automaton in the poem as an image of the material soul, as well as an emblem of immateriality.[104]

The notion of a material soul is linked, as Tiffany demonstrates, to Aristotle's usage of the word *soul* within poetics, and how the 'soul of an artifact become[s] evident through its material and technical features.' The soul is linked by these features to mechanical philosophy and atomism.[105] We are advised by the author, when considering the question of how this works, to avoid 'any firm distinction between corporeal and incorporeal elements' because 'the soul is a property not of the mind, or of some other impalpable entity, but of the body.'[106]

However, the body that the 'soul' of lyric poetry belongs to, in this instance, is not that of a purely physical body, but what Tiffany calls the '"meteoric" body of lyric'.[107] As Tiffany elaborates in a later chapter, 'meteoric' bodies are those '"engendered in the air"'[108], occupying 'a space between heaven and earth'[109], and have very little empirical reality. This lack of an 'unambiguous physical presence' is

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[103] Yeats, W.B. (1933; 1961) 'Sailing to Byzantium.' *The Poems of W. B. Yeats: A New Edition*. Finneran, R.J. *Ed*. London: Macmillan Publishing Company.
[104] Tiffany, 19.
[105] Ibid., p. 45.
[106] Ibid., p. 25.
[107] Ibid., p. 26.
[108] Ibid., p. 97.
[109] Ibid., p. 99.

characteristic of lyric substance, which Tiffany reveals is 'only breath—a pneumatic form—or traces of writing' and 'all but inscrutable.'[110] The lyric body, and its accompanying soul, are therefore positioned centrally between empirical notions of materiality and those of atomism, which paradoxically equates materiality and invisibility.[111] Both, however, insist on the primacy of the material, resulting in what Tiffany acknowledges,

> comprises an incoherent amalgam of empiricism and immaterialism, which, taken in its entirely, implies that the elementary particles of material bodies (the sole reality) are not merely unverifiable (in light of Democritean physics) but also inconceivable (if one admits the premises of empiricism).[112]

The end result would seem to be materiality slipping away entirely, and no verifiable reality at all. Despite this recognition, and despite the many reformers advising against this previously dominant philosophy, as Tiffany reminds us, 'The formal and epistemological aspects of atomism continue, indeed, to inform our most basic approaches to the constitution of knowledge and perception.'[113]

Tiffany's exploration of lyric materialism is certainly one way of considering how a text might reveal the soul; as he asserts, 'the lyric poem itself—its body—is the primordial image of the material soul.' So through what the body of the poem presents, we receive the image of the soul—but why must it be material? Why must the only reality be that of materialism? Why the insistence on mind's complete removal from the equation? How can our souls connect 'deeply and exactly' with the souls of others if the soul is simply the material residue, or ghostly breath, emanating from the lyric body of a poem—how do we even reach an 'other' without the mind? Though Tiffany's explorations are vivid, thorough, wide-ranging, scholarly and

[110] Ibid., p. 26.
[111] Tiffany, p. 44.
[112] Ibid., p. 171.
[113] Ibid., p. 165.

fascinating, and though Tiffany also helpfully points out where the contradictions and difficulties lie within the inscrutable borders of materiality, the very problem lies within the notion that a soul must be material, as Midgley points out.

Returning to the issues brought about by Descartes' philosophies, whilst also recognising the cultural challenges he historically faced[114] and appreciating the greatness of his thinking and his acknowledgement of personal experience's importance[115], Midgley explains that the particular reason that Descartes created such a problem was this insistence on the idea of mind or soul as substance. He 'pushed consciousness into a separate spiritual world, treating each soul or mind as a spiritual substance, made of stuff alien to other earthly items.'[116] And so the 'mind' was no longer a part of the human whole, 'not as a first-person aspect or point of view, but something parallel to physical matter but separate from it and not intelligibly connected to it.'[117] The effect of this division, this 'dualism,' was the initiation of a battle for 'the narrow throne of reality,' in which scientists came to view the mind as a rival to be eliminated, 'not like one aspect (among many) of the real world.'[118] Nevermind that reality is more than the empty spinning of atoms, and the elimination of personal experience, and the mind, from reality has simply managed to fracture it.

Whilst Tiffany has made an admirable attempt, the problem remains that 'this disembodied mind' cannot simply be forced back into the 'natural' world as defined by materialism, atomism, and physics.[119] This world, established as such by the authority of physics, simply 'leaves no room for this kind of entity,' but also, as Midgley iterates, 'thinking creatures could not possibly be isolated entities of this

[114] Midgley, p. 119.
[115] Ibid., p. 179.
[116] Ibid., p. 118.
[117] Ibid., p. 92.
[118] Ibid., p. 92.
[119] Ibid., p. 118.

kind. Thought involves communication.'[120] The necessary outlook must be altered, not insisting that soul and mind are made of any sort of substance, physical or otherwise, but instead stepping wide of the scientistic impulse to classify consciousness in an atomistic way. 'What thinks has to be the whole person, living in a public world.'[121] And what connects with the souls of others through communication, through poetry, through texts and shared images and ideas, must involve the mind.

Poet Albert Goldbarth, whose work I discuss at more length in Part II, was asked in a rare interview if he believed there is a spiritual element to text, to the book (2004). Wisely, he responded that it would much depend on one's definition of the term. Goldbarth also replied that the spiritual includes '…a sense of the cosmos larger than any human life or any one set of human concerns—a cosmos that interacts with us across the fixed borders of our skins.' And therefore: 'If that can be defined as spiritual, then a text is not only a proper part of such spirituality but a proper way of access into its immanence.'[122]

American poet A.R. Ammons, author of *Sphere*, a book-length poem that examines both the Earth and the multiplicity of its contents, views spirituality in a similar vein. As Susannah Hollister writes (2009), 'Ammons identifies 'the categorising mind' as the 'real source of spirit.'[123] She includes a portion of Ammons' correspondence with Harold Bloom, in which he elaborates, saying that, 'the spiritual has been with us and will remain with us as long as we have a mind.' As Hollister

[120] Ibid., p. 118.
[121] Midgley, p. 119.
[122] Goldbarth, A. (2004) 'An Interview with Albert Goldbarth [interview by Steve Gehrke]'. *The Missouri Review,* Vol. 27 (No. 1, Spring 2004), p. 63-81.
[123] Hollister, S.L. (2009) 'The Planet on the Screen: Scales of Belonging in A. R. Ammons's Sphere'. *Contemporary Literature*, 50 (No. 4, Winter 2009), 662-694, p. 678.

points out, 'Rational, "categorizing" thought might seem at odds with spiritual experience,' but it is this very variety of thought that 'generates the conditions for nonrational perceptions when it sets attention to a single scale be disrupted.'[124] This is an example of how the scientific mind, which is essentially a 'categorising' mind, can be so effective amidst the experiential processes in contributing to conditions in which the spiritual can develop and thrive. In Ammons' own work, as Daniel Tobin (2001) points out:

> What is born of this remarkable union of science and religion is a kind of hybrid consciousness in which the supernatural eternity is displaced by what Ammons repeatedly calls 'the ongoing' and 'the ongoing mind,' which is at once immanent in material reality and yet transcends our full comprehension.[125]

If we can find in poems evidence of these things, evidence of both the categorising mind and the double intent, evidence of soul-revealing language that shows both inner and outer at once, evidence of permeability and openness, then we can indeed say that there is something spiritual about these poems, that they demonstrate a spiritual component.

## THE 'FIRE'

> …the human aspiration to find what is true, what is real, and then to build lives in accord with that understanding. This aspiration, this 'constant fire,' as I call it, is as old as humanity itself.
>
> --Adam Frank, *The Constant Fire*[126]

Frank's focus in *The Constant Fire* is the focal point of human experience, and this shared 'aspiration', as what connects the endeavours of science and that of

[124] Hollister, p. 678.
[125] Tobin, D. (2001)'A.R. Ammons and the Poetics of Chaos'. *In*: K. Brown ed. *The Measured Word*. Athens, Georgia, USA: University of Georgia Press, 127-155, p. 137.
[126] Frank, p. 5.

spirituality. Frank thoroughly, closely, and earnestly examines the entrenched and fraught chasm between science and spiritual ideas. Through his seeking for a new conversation, a path towards real communication between the two, he comes to several realisations. One is the above, that this shared 'fire' is something that goes back far into our history as beings, and belongs to both. Another is one of the most significant for the possibilities of poetry in this conversation: 'The experience of the world's sacred character cannot be wrapped up and contained; it can only be pointed to through metaphor or analogy.'[127]

Award-winning American poet, editor, translator and human rights advocate Carolyn Forché delivered the Blaney Lecture in October 2013 at the Poet's Forum in New York, where she talked about 'The Poetry of Witness.' Therein she discussed how 'Consciousness can be incised by experience, seared by memory, awakened by what is seen and experienced and the poet's language also passes through this fire and is marked by it.'[128] For Forché the fire is not just the aspiration, but the awareness of the self involved in passing through an experience. This fire transforms the very language of a poet, contributing to the quality of experience that marks the presence of the soul. As Frank suggests, this language, marked by the fire, is one that seeks to reveal the world's sacred character through metaphor and analogy. Years earlier, Bronowski also demonstrated the necessity of symbolic concepts as a common denominator, in another key context: 'The symbol and the metaphor are as necessary to science as to poetry.'[129] But I would add also the details of imagery and the

[127] Frank, p. 81.
[128] Forché, C. (2014) *Not Persuasion, But Transport: The Poetry of Witness.* [Online] Academy of American Poets. Available from: http://www.poets.org/poetsorg/text/not-persuasion-transport-poetry-witness [Accessed August 1, 2015].
[129] Bronowski, p 42.

compelling progression of narrative. These are each key components in the way poetry may act as dialogue between science and spiritual concepts.

Robin Blaser focuses on 'The Fire' in his own essay of the same title in 1967. He speaks of a 'heat' that echoes Goldbarth's definitions of the spiritual, that which is bigger than the individual, but also that 'interacts with us across the fixed borders of our skins.' Blaser is after this spiritual element in poetry:

> The heat I'm after is not simply the personal heat of the meeting, the recognition, but a heat and a passion which are of the nature of existence itself. The personal, yes, but then the translation of a personal to correspond with larger and larger elements, images of earth, is a process of inclusion—a growth of sensibility, in Valery's phrase, but also a making which is not self-expressive. To be included, to be caught, to be brought over.

Blaser here of course echoes back to metaphor, whose etymology is exactly that: to 'bring across,' or to 'transfer over.' But also important to Blaser is the 'narrative of the spirit…the story of persons, events, activities, images which tell the tale of the spirit.' The story of the spirit he refers to in this context is cosmology, also recalling Goldbarth's 'sense of the cosmos.' Blaser goes as far as to say that 'the real business of poetry is cosmology.' The importance of this narrative will be addressed further in Part II of this thesis, in terms of science and recreated spiritual myth.

Prior to the Blaney Lecture, Forché remarked (2012) on the subject of consciousness relating to the spiritual as 'the capacity to be awake, a consciousness.'[130] Meanwhile, Li-Young Lee presses further stating that poetic consciousness is 'the only ethical consciousness available to humankind,' because it is 'complete' and 'allows for the whole human being.'[131] Lee goes on to say that 'Poetry is a way to integrate all of who we are.' While the grand stretch of this proclamation is uncertain, there is a truth to it. Poetry is indeed a place where the

[130] Forché (2012), p. 12.
[131] Lee, p. 129.

entirety of the human mind, body, soul, and experience may enter, and find a place to speak. Certainly poetry can contribute to this problem of identity and wholeness that plagues us as a result of longstanding divisions, those which we have now explored at length.

Science requires a certain amount of compartmentalisation for its nature of study, for its means of coming to understand the world. Science as a practice, of course, must use its necessary tools for its necessary ends. These may be different to those of the poet, the humanities scholar, and the spiritual seeker. However, some tools are shared. One of these tools is language, which is inevitably applied differently in poetry than in science. Though, perhaps more unexpectedly, there are places in which language will overlap in these areas, also.

### Where Poetry and Science Differ: Language

Czech immunologist and poet Miroslav Holub was at the centre of much discussion and exploration of the boundary between poetry and science in the latter half of the twentieth century. A practising scientist himself, as well as a practising poet, until is death in 1998, Holub was a dual citizen of the 'Two Cultures' of the sciences and the humanities for much of his life. This lead to his very valuable perspective, which allowed him to recognize where these two meet and where they have a wider divide. Holub's tendency is to state his stances unequivocally. He believes that poetry and science 'perform on the same stage, but move in the opposite direction' and that they 'do not share words, they polarise them.'[132] However, he amends, or qualifies, this statement – 'But they do not aim, in my mind, for opposite

[132] Holub, M. (2001) 'The Science of Poetry / The Poetry of Science'. *In:* K. Brown ed. *The Measured Word: On Poetry and Science*. Athens, Georgia, USA: University of Georgia Press, p. 54.

ends.'[133] He clarifies the reasoning behind his statement, revealing this has much to do with how either uses language:

> In the use of words, poetry is the reverse of the sciences. Sciences bar all secondary factors associated with writing or speaking; they are based on a single logical meaning of the sentence or of the word. In poetry, very definite thoughts occur, but they are not and cannot be expressed by words stripped of secondary factors (graphic, phonetic) and especially by words chosen so as to bar all possibilities except one. On the contrary, poetry tries for as many possible meanings and interactions between words and thoughts as it can.[134]

And so it is, by poetry's striving and stretching, that the possibility emerges for it to spread across just far enough between what must be said precisely, and what there are no words to express. Holub states that 'poetry moves ahead, paralleling the scientific paradigm into the realm of language, into areas less comprehensible for the reader accustomed to…scientific use of words.' Interestingly, Adam Frank also uses the concept of the parallel when discussing the aspirations of spiritual and scientific endeavours. He wants to make clear that while the two come from the same origin, they travel alongside each other rather than being the same: 'The point here is explicitly *not* to claim that something identical occurs in both science and spiritual endeavour. Rather it is to say that they are parallel in aspiration, with similar effects and affects.'[135] He believes that focus on human experience is 'the bridge over which we can cross between the domains of science and spiritual endeavour.'[136] So what is the shape of all this? This structure, this intersection? I propose a slightly different sort of mechanism, while still agreeing with Frank that science and the spiritual are parallel aspirations. And that is something like the Jacob's Ladder apparatus, familiar to physics—two parallel wires stand together upright, and a spark jumps and climbs

[133] Holub (2001), p. 58.
[134] Holub (2001), p. 56.
[135] Frank, p. 71
[136] Frank, p. 75.

up the 'ladder' between them. This spark that jumps between them is poetry, poetry made animate by the energy of human experience.

### What Poetry Shares with Science

Poetry and science do, however, share some qualities, and Holub is the first to recognise this. He supposes '…the common denominator of quality, of goodness, is in both cases the notion of a little discovery…that is going to stay and attract our attention also in the future, in other situations, and in different contexts.'[137] Something new is found or created in the process of both, when successful, and this changes our way of thinking into the future. Not only this, but, as Brown suggests,

> Perhaps the kind of imagination it takes to conceive of a radical and complicated new scientific theory, and prove it, is not so different from what is required to envision, compose, and successfully execute a great poem.[138]

The very generative processes of science and poetry are perhaps not all that different, as they require both imagination and precision. Midgley discusses the 'bridge-builders' of the Romantics, specifically Wordsworth and Coleridge, who desired to close the chasm between thought and feeling opened up by the Age of Reason, as they felt 'both were aspects of a single whole that might best be understood by attending closely to its middle term, imagination.'[139] It is this power of imagination that gives us our 'visions' which 'determine the direction of our thoughts,' in both poetry and science.[140] The importance of these visions cannot be undersold, as they create and change our world, as scientific visions have done already in our history.[141] Brown circles round again to come back to Holub's thought, that the shared endeavour of finding a new discovery is what unites the two: 'the resources of the human brain and

[137] Holub (2001), p. 59.
[138] Brown, p. xiv.
[139] Midgley, p. 75.
[140] Ibid., p. 2.
[141] Ibid., p.238-239.

our ability to create something unforeseen and revolutionary out of our dreaming.'[142] Both Midgley and Frank, doubtless among others, hold onto hope that our imaginations, engaging poetry and science together[143], and spirituality and science together[144], can create revolutionary change that may yet heal us, and our world.

## CHORD OF THREE STRANDS: POETRY, SCIENCE & SPIRITUALITY

By now, the overlap is becoming clear. Within the realms of poetry, science, and spiritual endeavour, we find that human experience, and human response, is at the heart of what unites these three strands. As Holub says of poetry and science, they 'emanate from the same deep level of the human urge, and the application of all available forces.'[145] Kaminsky and Towler (2012) write in their introduction to *A God in the House: Poets Talk About Faith*, 'In the end, what poetry and faith share, perhaps more than anything else, is a sense of awe. In awe is the beginning of a life of wonder.' The same can be said of science and spirituality, and is so by Frank: 'Science and spiritual endeavour are both responses to the lived sense of the world's great mystery.'[146]

What these three share also is a sense of inquiry. As Frank recognises, the response and the knowing is an inherent part of the question:

> Religious or spiritual experience, like the endeavour of science, responds to the world's beauty with an open-ended question: What is this? Such knowing is the 'still small voice' heard and known with an intensity that leaves an indelible mark.[147]

This shared sense of inquiry does not just lie in the overlap between the spiritual and the scientific, but also between that of the scientist and poet. Kelly Cherry writes in

[142] Brown, p. xiv.
[143] Midgley, p. 276-288.
[144] Frank, p. 228-254.
[145] Holub (2001), p. 65.
[146] Frank, p. 9.
[147] Ibid., p. 85.

her essay (1994) examining 'The Two Cultures at the End of the Twentieth Century' that '…we crave to know…the answer to the oldest questions'—and these are 'questions both scientists and poets would like to know the answers to.' These same questions are those that enter the hearts and minds of all of us, whichever ascending pathway that we choose. And as Cherry reveals, these questions are an essential element of creating unity again, of finding a common dialogue between these languages we speak:

> If none has yet fathomed a single answer, we may acknowledge that the questions themselves compose a kind of Rosetta Stone. Asking the same questions in our different languages of science and art, we learn to translate ourselves into one another, we see that we are different words for the same humanity. There is a vision of oneness here, amid the many voices in which the universe speaks its own being.[148]

The impulse to communicate our shared experiences of these questions is key to finding that humanity in each other.

### The Importance of Experience

I, like the poets anthologised by Brown in *Verse and Universe*, am not a scientist. Like them, the work I produce '…is not science, but art.' Brown makes this point in his introduction, and follows it with an essential note about poems that take on science as their subject, or use scientific themes. These poems, 'like any other poems—wind up as disquisitions on loneliness or chance, love, praise, hope, despair or any number of other subject from the timeless infinity of human experience.'[149]

Midgley asks of this problem of consciousness, this essential combinatory viewpoint that has been unhealthily left out and now leaves us ill:

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[148] Cherry, K. (1994) 'The Two Cultures at the End of the Twentieth Century: An Essay on Poetry and Science.' *The Midwest Quarterly* 35: p. 121–135.
[149] Brown, K., p. xiv.

> How can we rationally speak of our inner experience at all? How can we regard our inner world—the world of our everyday experience—as somehow forming part of a larger public world…?[150]

The inner experience of the outer world must find its expression, and this expression must be developed in language that can both embrace the irreducibility of being a subject, as well as employ strength of what is beneficial and strong about empiricism, without entirely rejecting it. The 'dual seeing' of Dickinson is a welcome place to begin, that which holds two viewpoints for better clarity.

Frank's experience as a scientist is what revealed to him the similarities of experience between science and the spiritual. 'The apprehension of the world through the lens of science…became [his] gateway for this sense of the world's sacred character.'[151] This sacred character, viewed through science, at the same time involves what scientific practice often excludes: subjectivity.

Frank is aware of the importance of an outlet for exploration and expression of experience beyond science, and this is down to the limitations of scientific language:

> There is something irreducible about being a *subject* that science does not yet have words for. There is something about *existing*, about the strange verb *to be*, that cannot be accounted for with words, graphs, or explanations. It must be lived.[152]

Science may not have the words, but perhaps poetry may find them.

But not without the assistance of science will poetry find the words. For scientific language has a key role in this—the structure and sturdiness of its unequivocal approach to words provides a scaffolding for meaning where otherwise spiritual language may grow too soft. As Holub says, when referring to the use of scientific language in poetry:

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[150] Midgley, p. 112.
[151] Frank, p. 7.
[152] Ibid., p. 77.

> …some essential scientific notions, postulates, laws, some basic stones of scientific syntax cannot be modified…even when used in a poem. The poem too has to keep some bones of the scientific skeleton of the world.[153]

And it is for this very reason that we must keep the bones.

Forrest-Thomson argues against I.A. Richards's (1930) distinct division of 'emotive' and 'cognitive' (referential) thought[154], and the complete isolation of the experience of the poem (considered emotive) from that of the linguistic meaning[155]—the term referential coming from science and pertaining to the sole authority of 'true or false.' The difficulty arises from Richards's insistence that the symbolic function of language, the only true way of 'gaining factual knowledge about the objects of experience,'[156] is mostly limited to science, and the poet's purposes are solely the 'inducement' of emotive 'experience,' and not in any way the communication of knowledge. Forrest-Thomson critically examines the flaws in this philosophy of language, because, as she points out, it is always 'necessary to find some kind of external context to account for the fact that we do find poetic language to be more than pure gibberish.'[157] Forrest-Thomson also recognises the arbitrariness of the division: 'the contrast between thought, which implies an object, and feeling, which implies a state of mind, is superficial only.'[158] The reality is that both the linguistic context and understanding of a poem and its emotional experience are part of a complete continuum, a larger whole. This whole is not unrelated to the whole that Midgley calls for recognition of, when purporting the need for integration of

[153] Holub (2001), p. 57.
[154] Forrest-Thomson, p. 17.
[155] Ibid., p. 20.
[156] Ibid., p. 19.
[157] Ibid., p. 25.
[158] Ibid., p. 25.

subjectivity and objectivity combined, and it is not unrelated to the need for multiple kinds of language within a poem.

For poetry to function effectively as a place of dialogue between the proposed areas of thought, the meanings of words, which may be expanded beyond and allowed additional resonance, must not then also be entirely separated from their original meanings and external referents. As Holub indicates here, these original meanings and external referents, especially within the context of the inclusion of scientific language, contribute strength and scaffolding, a distinguishing sturdiness from which to build associations.

## SPLITTING THE LARK: A PATHWAY TO DIALOGUE THROUGH EMILY DICKINSON

Undoubtedly in American poet Emily Dickinson's lifetime, the mind/body division was actively progressing. Though Descartes's impact had long been in place, Auguste Comte's theories of positivism were just freshly introduced into intellectual thought: *The Positive Philosophy* would have first been published in English translation when Dickinson was around eighteen years of age.[159] The following year Darwin's 1859 work *On the Origin of the Species* placed further challenges to previous understandings of creation, a Creator, and what it means to be human onto the landscape of thought. Comte's epistemological claims that the historical progression of human knowledge moved from theology, through metaphysics, and into the 'positive' meant that the scientific modes of observation and experiment came to be viewed as the most accurate means of coming to know truth, even about oneself.[160] This proposed abandonment of previous modes of knowing, via Comte, alongside Darwin's challenge to the theory of natural theology, certainly must have

[159] *The Positive Philosophy of Auguste Comte*, translated by Harriet Martineau, was published in New York in 1858.
[160] Midgley, p. 201.

added to Dickinson's feelings of personal division. Samantha Latham (2015) draws upon James McIntosh (2004), from his book *Nimble Believing*, indicating that Dickinson was familiar with Darwin and his importance in scientific thought, and had likely read articles published on his work by Asa Gray following the period of his publication.[161] Latham points us to Dickinson's poem 'Four Trees' which are positioned 'Without Design' to show how Darwin's theory inspired questions within her about cosmic design.[162]

For Dickinson, this division is not just mind and body, but also involves the soul—this division has a religious and spiritual element. Midgley does not leave that out. She acknowledges that difficulty of the soul 'concern[s] us now because we are conscious now,' and this issue of being a conscious subject, of being a mind that experiences, must be incorporated 'into the world where…we live.'[163] Consideration of the soul, and the soul's experience, are a part of finding unity and wholeness again.

Dickinson is also concerned with wholeness, especially with regard to experience. As is evident from her poems and letters, 'Dickinson wants to experience nature with her entire being, not with her intellect alone.'[164] One way in which she does this is by her inclusion of language pulled not only from her religious and spiritual experience, but also from the saturated potential of scientific language, a great deal of which is being generated by new discoveries in her lifetime.

Latham looks at the intersection of scientific and religious language in the work of Emily Dickinson, as well as later American poet May Swenson, considering

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[161] Latham, S. (2015) 'Those Who See: Emily Dickinson's and May Swenson's Poetic Language of Spiritual and Scientific Possibility.' Thesis, (MA). Utah State University. p. 7.
[162] Latham, p. 6.
[163] Midgley, p. 17.
[164] White, F.D. (1992) '"Sweet Skepticism of the Heart": Science in the Poetry of Emily Dickinson.' College Literature. Vol. 19, No. 1 (Feb., 1992), p. 124.

the effects of this combination. The 'characteristic interweaving of religious and scientific language'[165] functions, in turn, as framework 'to explore the productive tension developed when spiritual beliefs are challenged by new scientific observations' but also 'a model of thinking that frames doubt not as a threat to belief but as a source of spiritual richness that is grounded in questions rather than answers.'[166] This results in

> a syncretic approach to spirituality within which [Dickinson] insists on exploring the way scientific discoveries accommodate or influence human experience and understanding of the divine, to create an imaginative space where the implications of scientific theory can be considered.[167]

This is essentially due to the acceptance of doubt in her work, as well as the openness to entertaining multiple points of view simultaneously. Her habit of doing so helps to 'emphasize the value of remaining open-minded and considering a multitude of possibilities'[168] The richness of this exploration of how science's discoveries may 'influence' or 'accommodate' human experience and understanding of spiritual existence is largely created by Dickinson's immersion in the language of science itself.

Fred D. White (1992) considers Emily Dickinson as one of the foremost poets incorporating science into poetry within the last two centuries, possessing impressive complexity and depth in her scientific and technical vocabulary, and writing '[m]ore than 200 poems touch[ing] on scientific themes,' drawing from

> most of the sciences, from physical sciences such as physics, astronomy, to biological sciences such as botany, physiology, medicine, and even psychology.[169]

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[165] Latham, p. 3.
[166] Latham, p. 2.
[167] Ibid., p. 2.
[168] Ibid.,, p. 5.
[169] White, F.D. (1992) '"Sweet Skepticism of the Heart": Science in the Poetry of Emily Dickinson.' College Literature. Vol. 19, No. 1 (Feb., 1992), p. 121-128.

White provides a listing of these 200 science poems in the appendix[170], clearly indicating that these are poems that 'invoke a scientific concept' but not those that 'employ generic terms alone ("stars," "flowers")'. Dickinson was well educated in science, as well as enthusiastic in her learnings, and was also exposed to many new scientific discoveries and technical advances in her younger years, including discoveries of electromagnetic induction, chloroform, new planets (Neptune), and the first steam railway in the United States.[171] It would seem inevitable that this immersion would bleed through into her poetry. However, alongside the science exposure, there was the issue of her religious upbringing, and the challenges to the science brought about in her faith.

As White recalls, Dickinson was

> someone whose "Business is Circumference"', and she 'must have regarded science as a basis for testing the outer boundaries of human understanding and experience.[172]

Most certainly her body of work attests to her engagement with ontological and epistemological concerns, and this engagement takes place squarely between the science she absorbs and her lifelong struggle with faith that oscillated between gravity and rapture. Despite many poets of her time appearing to descry the dangers of science (though this was not as straightforward a condemnation as it seemed, as has already been thoroughly established), Dickinson struck a middle path, seeing the value in both sides. However, for Dickinson, science's empirical evidence has its limits: 'those phenomenological "secrets" [referred to in 'The Skies can't keep their secret!: those of 'summer' and 'snow']—the facts of science—are meaningless by

[170] White, p. 126-127.
[171] White, p. 121.
[172] Ibid., p. 121.

themselves.'[173] White goes on to elaborate that for Dickinson, 'it is the *scientistic* impulse, not the scientific, that is monstrous in its negation of the human spirit.'[174] (Emphasis mine.) Dickinson's perspective indeed echoes the concerns expressed by Paz, Midgley, Robinson, Herrnstein Smith, and others concerned with retaining the essential value of science whilst also challenging its charge of dominion over knowledge and inquiry.

Robin Peel (2010, p. 17, cited by Latham, p. 8) asks, 'What happens, then, if we consider the fascicles as laboratory or field notes and Dickinson's writing as part of a continuing experiment to observe, evaluate, and make sense of the material and immaterial world?' Indeed Peel considers Dickinson to be a 'poet-scientist,' and Peel is not alone in the recognition of Dickinson's frequent and numerous poems engaging directly with scientific material. Peel's question, however, is significant. For Dickinson often observes and records both the material world, usually nature, in her poems, as well as her spiritual observations of a world beyond ('He Fumbles at your Soul'[175]; 'Safe in their Alabaster Chambers'[176]). Not only this, she also engages in a probing scientific mind-set towards both the spiritual and scientific notions of experience, within which she 'interrogates and tests multiple worldviews' in order to 'allow for a critical consideration of both perspectives without demanding reconciliation of these inherent contradictions,'[177] and provides 'a method for testing our beliefs in order to increase our spiritual awareness.'[178] An example of this is in

[173] Ibid., p. 122.
[174] Ibid., p. 122.
[175] Dickinson, E. (1962) *Final Harvest: Emily Dickinson's Poems*. New York: Little, Brown & Company. p. 61.
[176] Dickinson (1962) p. 26.
[177] Ibid., p. 8.
[178] Ibid., p. 8.

her poem 'I felt my life with both my hands,'[179] in which Dickinson details an empirical examination of her being, starting by touching her very life with both hands (recalling her 'spreading wide my narrow hands / To gather paradise' in 'I dwell in Possibility'[180]), before holding 'my spirit to the Glass' (a nod to tools of empirical examination, such as perhaps the magnifying glass or microscope), as well as much prodding of the features in stanza three. All of this appears a way of empirically examing the abstraction of the spirit or soul, and becoming aware of its changed condition.

However, it is not just spiritual awareness that Dickinson is after. Dickinson's strength of perspective lies in her insistence on more than one vision, in that she 'does not hope to persuade readers to decide between spirituality and science,' but instead to 'emphasize the value of remaining open-minded and considering a multitude of possibilities.'[181] Latham explores Dickinson's poem '"Faith" is a Fine Invention'[182] to reveal how the poet's combination of language here demonstrates this appeal to simultaneously hold, and stretch, multiple perspectives, and indeed it is a fine poem, though quite brief, for doing so.

'Faith' is a fine invention
When Gentlemen can see—
But Microscopes are prudent
In an Emergency

Within this poem, Dickinson is appealing to both doubt and belief, observation and 'seeing' of a different manner. The terming of 'Faith' as an 'invention' (calling to mind also her declaration that 'Prayer is the little implement / Through which Men

[179] Ibid., p. 77.
[180] Ibid.,, p. 166.
[181] Dickinson (1962), p. 5.
[182] Ibid., p. 20.

reach / Where Presence is denied them'[183]) links the concept almost immediately to scientific technology. Yet this poem, as Latham points out, is appealing to:

> Christians and natural theologians….to expand what they 'see,' and believers not to reject faith, 'the fine invention,' but to 'see' not only through the eyes of religion, but through the lens of the microscope, the eyes of science.[184]

Dickinson's 'dual seeing'[185] is a part of the strength of her poetry, especially at a time when various movements were insisting on choosing distinctly between the two perspectives. As Latham indicates, she appeals to her audience to 'think from both perspectives in order to understand the world more clearly.'[186]

White also looks at how experiment plays a role in Dickinson's poetry. He explains that Dickinson uses 'poetry to perform…experiments in language, her counterpart to scientific experiments, which she accepted as equally valued efforts for apprehending essential Truth.'[187] Additionally, White points to Sharon Cameron's (1979) examinations of how many of Dickinson's poems are set up similarly to mathematical equations, or what Cameron calls '"metonymic equations" that "serve as links between the poet's interior world and the external phenomenon taking place"'[188]. Examples of these include 'Nature is what we see' or 'The Heart has narrow banks.' But, White reminds us, 'Dickinson's poetic equations perform the opposite function to that of their scientific counterparts: they are designed to heighten mysteries, not solve them.'[189] In this way they 'work to counteract scientific reductionism, which tempts us into thinking that science can present reality whole and undistorted.'

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[183] Ibid., p. 101.
[184] Latham, p. 15.
[185] Latham, p. 15.
[186] Ibid., p. 16.
[187] White, p. 122.
[188] Ibid., p. 122.
[189] Ibid., p. 123.

For Dickinson, and for many others of this period, the notion that science could present the whole of reality without distortion was one that necessitated battling, as there was more to the world than a 'single vision.'[190] An example of this rebuttal can be found in 'Split the Lark—And you'll find the Music':

> Split the Lark—and you'll find the Music—
> Bulb after Bulb, in Silver rolled—
> Scantily dealt to the Summer Morning
> Saved for your Ear, when Lutes be old—
>
> Loose the Flood—you shall find it patent—
> Gush after Gush, reserved for you—
> Scarlet Experiment! Sceptic Thomas!
> Now, do you doubt that your bird was true?[191]

As Lennart Nyberg observes,

> 'The theme seems to be fairly straightforward—it is about the skeptic's need to find physical evidence of the invisible, as in Thomas's inability to believe in the resurrection of Christ until he could actually touch the scars with his own hands.'[192]

There is also with it the Wordsworthian sentiment that Positivist science '"murders to dissect"'[193], and though the Lark's 'Music' is revealed as beautiful—'Bulb after Bulb, in silver rolled'—the flood unleashed of its blood ('Scarlet experiment!') is 'patent,' a term linked to medicine meaning an aperture or cut is open and unobstructed, failing to close. The splitting of the lark most certainly ends in death, with the nature of its value bleeding out to silence.

However, scepticism is not the enemy to Dickinson, and is indeed an essential part of 'being fully alive,' as well as the conflict between thought and feeling she has

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[190] Midgley, p. 75.
[191] Dickinson, E. (2007) *The Poems of Emily Dickinson 1852-1886*. Todd, M.L. and Higginson, T.W. (1890) *Eds*. Raleigh, NC: Hayes Barton Press. Public Domain. p. 861.
[192] Nyberg, L. (1997) 'Translating "Split the Lark" into Swedish.' *The Emily Dickinson Journal*. Vol. 6, No. 2 (Fall 1997), p. 113.
[193] White, p. 124.

no designs on entirely resolving.[194] White points us to two poems supporting this, 'Sweet Skepticism of the Heart' and 'The World is Not Conclusion'—both of which reveal the necessity of 'Not only emotion-based wonder, but intellect-based skepticism.'[195] Dickinson's 'Circumference' encompasses both, an un-split whole.

Emily Dickinson and Walt Whitman, her contemporary, were not ultimately Transcendentalist poets; however, Transcendentalist figures Ralph Waldo Emerson and Thomas Wentworth Higginson were largely responsible for their eventual fame and integration into the literary cannon of Transcendentalist writers.[196] As Ed Folsom (2010) explains, in his consideration of 'Transcendental Poetics: Emerson, Higginson, and the Rise of Whitman and Dickinson', 'poetry was to the Transcendentalists "the occasional rather than the chief mode of expression"'[197] and most often their poems were 'formal, traditional, and "epigrammatic" poetry'[198] characterised by a 'a persistent striving for the arresting compressed statement' (Buell 1993, p. 98, in Folsom 2010, p. 264). Additionally, the subjective point of view was often rejected for its inadequacy amongst them, and if the grammatical first person perspective is at all present, it:

> …will inevitably turn out to be…'effectively an everyman,' as 'particularized experience' and 'psychological complication' are rejected in favor of 'aphoristic statements' and 'typic figures' (Buell, 1993, p. 113, 116, in Folsom, 2010, p. 264).

[194] Ibid., p. 125.
[195] Ibid., p. 125.
[196] Folsom, E. 'Transcendental Poetics: Emerson, Higginson, and the Rise of Whitman and Dickinson.' In: Myerson, J., Petrulionis, S.H., and Walls, L.D. *Eds*. (2010) *The Oxford Handbook of Transcendentalism*. Oxford: Oxford University Press. p. 288.
[197] Folsom, p. 264.
[198] Ibid., p. 268.

The bodies of work of both poets contradict these characterisations in a number of ways, making their classification under Transcendentalism even more contradicting, because, as Folsom cogently explains:

> Temporal sequence, particularized experience, and intense subjectivity are the tools of the trade for Walt Whitman, just as subjectivity and psychological complication might be said to define Emily Dickinson's poetry. In that sense, these two unlikely founders of an American poetic tradition seem anti-Transcendental, and their simultaneous concoctions of radically innovative yet strikingly dissimilar poetic forms and voices would seem, if related to Transcendentalist poetry, to be rejections of its basic ideas as well as of its traditional forms.[199]

Transcendentalism as a philosophy began to emerge in the 1830's, driven heavily by a number of movements, and Emerson was a substantial force in defining what the Transcendentalists stood for, separating them from the materialist ideology of the time to which they objected. Emerson asserted, in his 1841 lecture, a populous

> …divided into two sects, Materialists and Idealists; the first class founding on experience, the second on consciousness; the first class beginning to think from the data of the senses, the second class perceive that senses are not final, and say, the senses give us representations of things, but what are the things themselves, they cannot tell. (Emerson, 1841, in Myerson, et al, 2010).

Despite the Transcendentalists' aversion to the Materialists' insistence on the finality of empirical knowledge, they were not science-averse. According to *The Oxford Handbook of Transcendentalism* (2010),

> They did not reject but redefined Enlightenment ideals of scientific experimentation, following the latest scientific theories, which sought not only to understand the phenomena of nature through empirical investigation and sensory experience but also to discover behind the screen of appearances nature's underlying truths, its laws or principles.[200]

The Transcendentalists' embrace of science and choice to follow and educate themselves on new scientific discoveries is significant, as it was within this culture

[199] Folsom, p. 264-265.
[200] Myerson, et al, p. xxiv.

that Dickinson and Whitman were becoming poets. As has already been established, this was a period of feverish scientific advancement, and Dickinson in particular was immersed in a thorough scientific education from a young age, at Mount Holyoke Seminary.[201] Both Dickinson and Whitman engaged with the notions of the atom, biology, astronomy, and other science concepts immediately relevant to current events and discoveries, in their poems. The language of science, and the widespread cultural embrace of it, became a part of how either poet approached the epistemological and ontological questions of their existence.

Whitman's poem 'When I Heard the Learn'd Astronomer'[202] is worth mentioning, in this context, as it demonstrates the atmosphere at the time of learned and thorough scientific scholarship available to the interested public, for Whitman recounts 'proofs, the figures, were ranged in columns before me' and 'I was shown the charts and diagrams, to add, to divide, and measure them.' Certainly Whitman must have had an interest in learning these things, as he attended the lecture in the first place. However, this is not enough; as with Dickinson, the simple facts by themselves are meaningless. The context of experience is also needed: for Whitman departs outdoors, where he, 'from time to time, / Look'd up in perfect silence at the stars.'

Thomas H. Johnsons' introduction to *Final Harvest* (1964), a selected collection of Emily Dickinson's poems, explains that Dickinson, when asked what she was reading by her long-time correspondent and literary mentor, essayist and reformer Thomas Wentworth Higgins, Dickinson replied, 'For Poets, I have Keats,

[201] White, p. 121.
[202] Whitman, W. (2015, 1865) 'When I Heard the Learn'd Astronomer.' In: *Drum-Taps: The Complete 1865 Edition*. New York: New York Review of Books. p.

and Mr and Mrs Browning. For Prose, Mr. Ruskin, Sir Thomas Browne, and the Revelations.'[203] As Johnson observes,

> The significant names, as a study of her poetry amply confirms, are the last two. Browne's concern with language and his solemn reflections on death and immortality are at the heart of Dickinson's inner world; its soul is the ecstatic vision of John of Patmos.[204]

Perhaps this combination of ecstatic and solemn response was also mirrored in myself, and I recall I certainly felt a kinship with Dickinson in my young life, upon discovering her poems around the age of eight. Certainly I was attracted to her poems' 'many paradoxes, and as a poet she adopts a variety of masks.'[205] Similarly, I was set between a faith tradition, that of my parents in a conservative American community (though my own was in the Midwest, rather than Calvinist New England), and a world bubbling with a constant stream of science advancements, many of which fascinated me and continue to in my adult writing life. I found in Dickinson a voice that expressed both a frustration with blind faith and a challenged soul in the face of what scientistic perspectives said was the entirety of reality. I wanted to know and experience with my whole being, and I did not want to have my questions silenced either, as was often the case within religious contexts. I felt something lay beyond the world I knew, but also felt the world discovered by science held its own amazements. Dickinson perhaps 'knew that she could not pierce through to the unknowable, but she insisted on asking the questions.'[206] One can't help hoping for a reply.

These elements of Dickinson's poetry, and the resulting considerations, are entirely significant as we transition towards discussions of contemporary poets as well

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[203] Johnson, T.H. 'Introduction: The Vision and Veto of Emily Dickinson.' In: Dickinson, E. (1962) *Final Harvest: Emily Dickinson's Poems*. New York: Little, Brown & Company. p. v.
[204] Ibid., p. v.
[205] Dickinson (1962), p. xiii.
[206] Ibid., p. xii.

as the created manuscript *Twelve Foundation Stones of the New Heaven*, and further exploration of science and spirituality in dialogue within poetry. She is a fine example in a number of different ways of a poet whose work functions as a place of dialogue between science and spiritual ideas. Dickinson's engagement with science, in terms of language, concept, image and epistemological limitation; her experimentation and records of observation; her insistence upon 'dual seeing' and balance of wonder and scepticism; and her permeable spirituality, that of openness that favours questions over answers, that favours of uncertainty's possibility over certainty's are all aspects I explore, as well as adding to these others developed within my own work and the work of other poets important to this thesis. Dickinson also demonstrates, as will the contemporary poets discussed in Part II of this thesis, the ways in which poetry engages the epistemological and ontological questions of science also invites into this inquiry a spiritual component—to 'dwell in Possibility.'[207]

[207] Dickinson (1962), p. 166.

## Part II: Opening the Stone's Door

I knock on the stone's door.
—It's me, let me in.
I don't seek sanctuary for all eternity.
I'm not unhappy; not shelterless;
my world is worth returning to.
I will enter, leave empty-handed.
The only proof that I was there, truly,
will be words—and who'll believe them?

—Wislawa Szymborska, 'Conversation with a Stone'

### NOT GOD, EXACTLY.

Joel Primack, professor of physics and astrophysics at the University of California – Santa Cruz, and one of the world's leading cosmologists, along with Nancy Abrams, a cultural philosopher specialising in the history of science, has examined how we view ourselves and our significance within the universe in their 2006 book *The View from the Center of the Universe: Discovering Our Extraordinary Place in the Cosmos*. The authors do so within the context of both our present-day science-based cosmology as well as the history of our created myths, which provided our existence meaning in earlier periods of history. They progress further to examine how a shared, meaningful cosmology is imperative for securing the human future (which they expand upon further in their 2011 follow-up volume, *The New Universe and the Human Future: How a Shared Cosmology Could Transform the World*), positing that we must create new myth, a new common cosmology in order to unite cohesively enough to move forward together as humanity against the struggles we collectively face – and that this must include what we know of science.

While the poets I seek to examine here aren't quite yet crafting a new common myth for humanity, they are using science's revealed cosmology and employing that

same impulse. By taking in accepted stories from science, the agreed-upon facts that we all know and absorb into our worldview, the result is something most readers can recognise as a part of their shared experience, their shared understanding of order and origin. The poets combine these with their own notions of a deity, celestial beings, or a 'Not God, exactly', and create new myths with personal meaning out of their own experiences to manifest a spiritual understanding, redefined by the context of scientific cosmology. 'Myth is the way human beings *relate* to their universe'[208] and our growing scientific understanding of what lies beyond our sphere drives in many poets a desire to relate in human ways to the universe this represents.

American poet Tracy K. Smith, who was awarded the Pulitzer Prize for Poetry in 2013 for her collection *Life on Mars*, embarks, in several poems, upon a path of envisioning new cosmology and creating her own spiritual mythology, using plentiful astrophysical and astronomical ephemera and terminology. Smith also employs recognizable pop figures as prophets and deities, 'thin-hipped' and 'glittering' with stars (as with the introduction of David Bowie as deity in 'Don't You Wonder, Sometimes?'[209], a poem later in the collection), or simply asking for whiskey and a smoke on a still summer night (as the Charlton Heston does on his celestial visit to the poet in 'My God, It's Full of Stars'[210]), yet bellowing to be let in 'like Moses: arms raised high, face an apocryphal white.'

Heston appears as a sort of divine intermediary, entirely characterised by his human self yet performing in the poem as a supernatural prophet of both the past and future. He comes to tell the origin story. Smith is asking Heston, 'to start from the

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[208] Primack, J.R. and Abrams, N.E. (2006) *The View from the Center of the Universe: Discovering Our Extraordinary Place in the Cosmos*. New York: Riverhead Books. p. 33.
[209] Smith, T.K. (2011) *Life on Mars: Poems*. Minneapolis, Minnesota: Graywolf Press. p. 19.
[210] Smith, p. 8.

beginning, but he only goes halfway back,' as if Heston would be able to tell her the whole story of our origins, the real story, all the way back to the Big Bang, if he'd only been willing. Heston only reveals that 'That was the future once, ... Before the world went upside down.' A bend in spacetime or a backwards creation, the story is obscured from view but hints at something outside of time, the cosmological roots of our origins.

The interaction occurs entirely in Smith's real or imagined home space, and the scene is punctuated with a constellation of everyday evening sounds that trickle into the room. But there is something otherworldly about the space. Speaking of Heston, Smith calls him 'Hero, survivor, God's right hand man,' recalling again his role as Moses. But also that, 'I know he sees the blank / Surface of the moon where I see a language built from brick and bone.' These lines seem to reveal the significance of heavenly bodies to Smith as relating to language, to meaning, to the whole story of our existence. The moon is not just a moon, a blank slate. The moon is our history and our mortality, part of a shared language that has its roots in culture and community, in the previously shared myths that created earlier religions. Not least, the body of the moon is part of the pattern of cosmic matter that tells our story in full, all the way back to the beginning.

The title of the poem comes from the ultimate line spoken by the character of Dave Bowman in Stanley Kubrick's film *2001: Space Odyssey*, when Dave is 'whisked into the center of space' as Smith says in her poem, in a passage that describes the moment in opulent detail (it 'unfurls in an aurora of orgasmic light / Before opening wide, like a jungle orchid / For a love-struck bee'). Smith treats the film to a key section of the poem, the fourth of five sections that make up the piece. Aligned to this description is the speculation of whether our ability to conceive of our

existence is challenged when what we experience is beyond words. Taken from the world we can conceive of, Dave is fired into a cosmos inconceivable. Smith asks, ‘Is it still his life he moves through, or does / That end at the end of what he can name?’ It may be that a poem so urgently reaches for ways to express the inexpressible in order to retain life, experience, as our own even in the face of worlds we do not recognize.

The title of this poem isn't limited to this cinematic scene or reference, as the poem incorporates also Smith's experiences staring into the night sky full of stars and wondering about her own existence, and whether or not we are alone. The title seems also to whisper forward to her ‘god’ in a later poem, Mr. Bowie, who is himself a Starman, full of stars. His emergence in ‘Do You Wonder, Sometimes?’ is in answer to those stargazing nights of her childhood, in answer to the question of whether or not we are alone.

The first section of this three section poem opens up once again with a gaze into space, that primeval impulse of seeking the stars that infects poets and scientists alike. Yet the view of the night sky in Smith's poem reveals also an understanding of the scale of measure in astronomy – distance: ‘After dark, stars glisten like ice, and the distance they span / Hides something elemental.’ However, this elemental ‘something’ isn't distant amino seeding on a spinning asteroid or interstellar dust, but Smith's ‘Not God, exactly.’ Out of that searching stare into the cosmos comes the spiritual guide that resembles God for Smith but isn't God, is instead a supernatural glam idol with the appeal of slick and effortless cool (Smith indeed later in the poem calls him ‘the Pope of Pop, coy as Christ’). The poem here reveals in its third line ‘Some thin-hipped glittering Bowie-being — a Starman / Or cosmic ace.’

This cosmic ace isn't so coy that he would avoid our detection entirely, for he is there, that ‘someone....squinting through the dust, / Saying nothing is lost, that everything lives on.’ The emergence of the figure becomes a fulfilment of the poet's desire for a benevolent force, merging with the view of stars burning at light-years' distance back in time. There is an ache for spiritual reassurance from the vastness of the universe, from all the measure of distance, and Bowie's Starman materializes as the cosmic answer to this elemental need – created by the poet, made into myth.

In section three of the poem Smith continues to speak of Bowie using phrases similar to people speaking of a pervasive God—such as ‘God is with us’ or ‘God is everywhere,’ yet still in her very local, personal, human context: ‘Bowie is among us. Right here / In New York City.’ Described as wearing a baseball cap and expensive jeans, this Bowie ducks into delis and hails a taxi at dusk. Yet one might also read this incarnation as a new translation of god-made-flesh, hiding a vast divine nature in the body of a man.

Holy David Bowie's defining characteristics are definitively celestial in the astronomical sense. Planets, stars, comets and tails of white-hot matter reveal that it is by these very elements of the galactic universe that we know he is god-like. The mythical divine in Smith's poem is that which shows itself to resemble the awe-inspiring, vast and blazing composition of our universe. Smith reveals that although the Starman, Holy Bowie, is ‘among us,’ she has never seen him, and likens this to ‘not knowing / A comet from a shooting star.’ However, like many a seeker after the divine, she theorises after his nature, here both comparing his appearance to that of a comet and contrasting this to our own comparably pedestrian activity:

> But I'll bet he burns bright,
> Dragging a tail of white-hot matter
> The way some of us track tissue
> Back from the toilet stall.

Even in the mundane the Starman pitches off the thermal radiance of a white-hot plasma sun, growing in size as he is revealed in his cosmic majesty. Bowie-as-god is shown as larger than life, galactically sized: ‘He's got / the whole world under his foot.’ (And with these lines comes the echo of the children's church song ‘He's God the Whole World in His Hands.’) Smith leads from here back to the spiritual hunger for assurance that began the poem, this time addressing the godlike Bowie directly, as if in prayer: ‘Bowie, / I want to believe you.’

There is further desire expressed by Smith in her appeal, a request ‘to feel / Your will like the wind before rain. / The kind everything simply obeys.’ The idea of the supreme will of a divine being is quite familiar as a conviction of certain faiths, and Smith aligns this in her simile to a force of nature, one linked inextricably to the orbit and rotation of our planet (weather patterns, wind and rain). It would seem that Smith is appealing to the universe for an answer, to be felt a part of ‘that hypnotic dance’ that is omnipotence played out in the music of the spheres.

There's a clear indication that for Smith, the divine is cosmically freed of the laws that limit and constrict human beings, mortals for whom the Arrow of Time and Second Law of Thermodynamics are insurmountable limitations of existence. Though she does not speak of these commandments of physics by name, we see the Starman, glam god of the cosmos, is unaffected by entropy, which envelops Smith in her sweltering New York City summer: ‘Silently, lazily, collapse happens. / But not for Bowie.’

In fact, the Starman is immortal: ‘Bowie will never die. Nothing will come for him in his sleep / Or charging through his veins.’ Here again Smith is assigning more traditional attributes of deities to Bowie, ones we can easily recognise. Bowie is ‘in no rush,’ eternal, limitless, and he represents the freed existence from time. Smith,

returning to our own human predicament, asks us, ‘Time never stops, but does it end? And how many lives / Before take-off, before we find ourselves, all glam-glow, all twinkle and gold?’ This sparkling afterlife is both the shimmering spectacle of stars, comets, and supernovas, but also the cosmos personified in Bowie's Starman, the hovering ace that is both sized to New York City delis and capable of containing the whole world beneath his feet. We are measured by our terrestrial travels, blinking lights under the dome of our home planet: ‘Jets blink across the sky / Like migratory souls.’

The cosmic divinities aren't always limited to celebrities adopted into deism. Some are modelled more simply on the divine mother archetype, as in ‘My God, It's Full of Stars’: ‘A cosmic mother watching us through a spray of stars, / Mouthing yes, yes as we toddle toward the light, / Biting her lip if we teeter at some ledge.’ Yet while the mother, set among the stars, aches to ‘sweep us into her arms,’ the father is markedly contrasting in his nature, echoing perceptions of an angry Father-God (of Judeo-Christian convention) by his ‘Ranting with the force of Kingdom Come.’ Yet, how very human he also seems, as he ‘storms through adjacent rooms,’ ‘not caring anymore what might snap us in its jaw.’

Smith's father, whose loss deeply influenced her explorations in *Life on Mars*, was an engineer who worked on the Hubble Space Telescope, and the entire collection is a tribute to him. Smith has stated that the second section of the book is in fact an elegy sequence for him, and also that he makes an appearance as a young man in ‘My God, It's Full of Stars.’ She says that the book wasn't originally conceived of in this way, however, but that she ‘was simply interested in thinking about space as a kind of metaphor through which to consider some of the facts and problems of life

here on Earth.'[211] This is precisely the shared impulse at the heart of Primack and Abrams appeal for a shared cosmology – using the information, ideas, and concepts that science provides to consider what we face as humans here on Earth. And at the centre of these poems, of course, is Smith's own human experience, both real and imagined, as the pivot on which these considerations revolve.

Barbara Brown Taylor, an Episcopal priest, wrote about her explorations into various areas of science, including quantum physics and chaos theory, and their impact on her faith in 2000. Here, she discusses how she finds

> …so many lay people are reading science right now [because] it offers them a way to approach the mystery of the universe without all the dogma and divisiveness they have come to expect from religion.[212]

Taylor also sees this as important in moving towards a way towards a unifying belief, rather than a fragmenting belief, as many systems of belief have been in the past due to their nature as local and tribal. She references American astrophysicist Brian Swimme, who has discussed how 'we have been shaped by narratives that teach us to focus on our differences from one another. Many of those same stories also each us to see ourselves as separate from the planet in whose bosom we are nested.'[213] Taylor feels that science can offer a way towards a shared belief, or as Primack calls it, a shared cosmology. Science can at least give us a pathway towards an open dialogue, in combination with poetry, which is a solid beginning. Science offers a common set of shared ideas, facts, and notions to draw from, no matter what tribe we come from.

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[211] Wall, M. (2012). '"Life on Mars": Q&A with Pulitzer-Winning Poet Tracy K. Smith'. *SPACE.com*. [Online] Available from: http://www.space.com/15538-life-mars-tracy-smith-pulitzer-interview.html. [Accessed 23 Sept 2014].
[212] Taylor, B.B. (2000). *The Luminous Web: Essays on Science and Religion*. Plymouth, UK: Cowley Publications. p. 26.
[213] Taylor, p. 34.

GOD AS FIRE AND THE FLUID SOUL

'Millenium Map of the Universe' (2000) opens with the line 'It's a beautiful heaven,'[214] straight away containing a word quite charged with spiritual meaning as well as meaning the sky or cosmos, depending on context. The context of this poem is a specific image released by National Geographic in the year the poem was written, showing what cosmological science knew of the universe at that time. Rogers goes on to describe this image as: 'shining aqua / arrangements on black, scattered / chips of pure turquoise, gold…ruby sand…glowing stellar dust, beads / like snow, like irregular pearls.' This is not the only poem in Rogers' oeuvre to adopt the language of precious stones and metals to help describe the cosmos. There are also visible alliances between Rogers' use of precious stones and my own, both in the prose-poem series and 'Singularity's Sum.'

What distinguishes this piece as a reinvention of God is how Rogers moves into the next stanza: 'Last week, I thought this heaven was / god's body burning, as in the burning / bush that is never consumed.' Here we have God's being, or 'body,' redefined in the terms of cosmology, burning with stars and galaxies, 'each form of light and darkness / in that combustion was the glorious / art of god's body on fire.' The poem is also an exploration of the nature of belief, as the following two stanzas begin with the lines 'But yesterday I believed it was music' and 'Today, I see it is just signal numbers,' showing how belief can evolve and change, as well as how science simply does exist as data sometimes. However, Rogers ends the poem with a short stanza returning to this essential juxtaposition of both particle, cosmos, and God: 'I wish I could sing like electrons / on a wheel. I wish I could burn / like god.'

[214] Rogers, P. (2001b) *Song of the World Becoming: New and Collected Poems 1981 - 2001*. Minneapolis, Minnesota, USA: Milkweed Editions. p. 49-51.

Pattiann Roger's poem 'Angel of the Atom'[215] is considers the idea of an angel in terms of particle physics, a concept we are used to picturing through the classical ideals of religious art—the figurative, androgynous angel with golden hair, tremendous wings, and pious, upturned gaze. However Rogers re-envisions the angel through imagined descriptive and the observable characteristics of an atom: 'Actual but nonexistent, she is a crease / Of light spinning to a hair-sliver / of silver.' The phrase 'invisible clutching and releasing' refers to an atom's attracting and discharging of electrons. This angel is positioned as the base level of material reality, both undetectable and the very thing that makes all physical reality—catalogued in the series of ecological imagery throughout the first, second, and third stands. The Angel-Atom initiates 'The spermatozoa of princes and newts,' and 'she is the syllabic movement / Of the cricket's leg'.

Rogers creatively reinvents a concept usually embedded in conventional understanding, instead defining an angel as something infinitesimally tiny and existing within the form of the very thing that makes all things. 'She closes her eyes and creates time.' She is 'a measurable body of the immeasurable.' There is something of the Angel-Atom that seems to create us, also, in this poem. There is a sense of a pervasive divinity that emerges in each one of us, as humans, perhaps hinting at the soul. This angel 'presses herself continually upward' through the body, 'hearing the sound of her own name / Spoken by the voice she becomes in the brain.' Here, perhaps, is consciousness. The voice in the brain that she becomes, we become. And hence: 'She meets herself continually as heaven in the eye.' It is something we see in ourselves and in each other, a sacredness we recognise. So this definition of an

[215] Rogers (2001b), p. 158-159.

angel, of a spirit, is entirely redefined through scientific language – again, both of particle and of the brain.

Miroslav Holub handles angels much differently. For instance, in 'Dreams,' the angels appear as an image within a dream, the final of a series of irrational images: 'a flock of angels in the sky / is taking an evening class / on the skid pan.'[216] Certainly such an activity would be unnecessary for angels, as divine creatures, but they exist alongside 'a black swan' hatching 'from a pebble.' The next stanza the dreams shift to a preference for the pragmatic, three times three is nine, grass grows back when the circus leaves town.

However, in 'The earliest angels,' Holub describes them as 'swarthy, stooped, / hairy, with sloping foreheads' – not that unlike our own evolutionary ancestors—aside from their 'two parachutes of skin.'[217] But these were different creatures, they 'performed astounding miracles,' such as 'atomic fusion at room temperature' and 'stirrings of consciousness.' And yet they are still so very earthy, human in their actions: 'They worked hard'; 'They swam in murky waters.'

The soul in Holub's poems is not, in contrast, human-like at all. In 'The Soul,' it is compared in the poem's extended metaphor to 'a yellow / inflatable balloon' bouncing along Queen's Street on a Friday night without grounding and with 'what remained of its helium soul / still two lives left.'[218] As the poem progresses, the helium soul is revealed to be 'incapable of salvation and / incapable of destruction' – both a scientific observation and a statement of belief, it would seem. The soul seems to also be energy, subject to the Newton's Third Law. The poem closes on the images of the balloon's helium soul waning. With 'half a life left, / just a molecular trace of

[216] Holub, M. (2006). *Poems Before & After*. 2nd ed. Tarset, Northumberland, UK: Bloodaxe Books. p. 198.
[217] Ibid, p. 402.
[218] Ibid, p. 194.

helium,' the balloon seeks out 'a small child's hands / on a Sunday morning.' One can't help but find an echo of the instruction to have childlike faith heard in recitation of the book of Matthew. Yet, here is the soul defined as helium—so utterly unlike that of any religious text, and so separate from the human vessel usually associated.

This is not the only time Holub refers to the soul in terms of helium, as in 'The man who wants to be himself,' he states, 'his soul is lighter than helium.'[219] In 'Crush Syndrome,' however, the soul is described entirely oppositely, in terms of material substance rather than meteoric or invisible substance.[220] The speaker in the poem has just had his hand crushed in a concrete mixer, and the soul seems to be described as the hand itself—the soul emerges in pain and damage: 'It was soft, with red stripes, / and it wanted to be wrapped in gauze.' During healing, 'The soul turned, at first, / to granulation tissue, / and later a scar, scarcely visible.' In each case, the soul is something tangible, measurable, and evolving.

Lastly, in 'Creative Writing,' a poem appropriately written late in his life (and in fact, a poem which was in the process of being translated in the weeks before his death), the physical act and physical output of creative writing (in this case, an old woman 'On the express train to Vienna' writing in her diary; in Holub's case, the poem itself) is 'the last drop / of the fluid soul / before evaporation.'[221] The soul is not solid or ephemeral gas, but a fluid moving from a liquid to a gaseous state at the end of its life, similar to the yellow helium balloon soul. Tiffany's creation of the soul within the poem is recalled by Holub's poems—the poet defines the soul through imagery.

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[219] Holub (2006), p. 220.
[220] Ibid, p. 310.
[221] Holub, M. (2008). 'Creative Writing.' [Online] Available: http://www.poetryfoundation.org/poetrymagazine/poem/181310. [Last accessed 29 Feb 2016].

Holub's long-time translator, Rebekah Bloyd, penned a memorial essay titled 'A Poet in Death Valley: Remembering Miroslav Holub' (2009) not long after his death. In this essay, Bloyd remembers driving through Death Valley with Holub, asking him directly, 'What do you think about angels, Miroslav?'—to which Holub responds, 'Angels, they are present in the poems. But…they are not required to save anyone.'[222] The angel of Miroslav Holub is, much like the soul, 'a changeable entity, unpredictable and vulnerable to experience.' In my poem 'The Present Moment' I mention two of Holub's challenges: 'He could only imagine eternity / and the present worried him / like a bit of string' and 'Miroslav has been writing / about angels / and this bothers him.' I follow along with stanzas revealing the nature of these puzzles, and also cataloguing them within the framework of this present moment. The title comes from his essay 'The Dimension of the Present Moment,' where he explores the very nature (and perimeters) of what makes a moment in time for human beings. This poem is in a way in conversation with Holub as much as about him.

In his essay 'Tissue Culture, or About the Last Cell' (1990), Holub casts aside some of his more brusque science-minded rationality and spends several pages considering the question, 'How much truth can one find 'in glass'?'[223] As an immunologist, Holub had close experience working with cells in the laboratory and going through the process of disposing of 'waste tissue culture,' or mostly dead cells, but for perhaps one cell that had not yet perished: 'One cell in a thousand, one cell in a million, one cell in ten million.'[224] And for Holub, that one small cell is quite

[222] Bloyd, R. (2009). 'A Poet in Death Valley: Remembering Miroslav Holub.' [Online] Available: http://www.poetryfoundation.org/poetrymagazine/article/237074. [Last accessed 29 Feb 2016].
[223] Holub, M. (1990). 'Tissue Culture, or about the Last Cell.' *New England Review and Bread Loaf Quarterly*. 12, No. 4, On Science (Summer), 376-379, p. 376.
[224] Holub (1990), p. 378.

important, and to the human soul it has something to say, even if for the daily practising scientist, 'usually, there is no time to listen': [225]

> It's no longer the voice of the tissue culture, the simplified vocal register of life, but rather the whisper of the last, lonely, useless, but nonetheless hopeful, hope. No longer science but still poetry.[226]

As Holub says, this whisper is nothing that is 'essential for the ear of biology,' but a 'cosmic sound.' Holub realises that there is 'something optimistic' in the mere existence of that single cell that did not or would not die, something that despite its loneliness and condemned state, 'in the fact of the last cell the essence emerges – an essence which assisted the onset of cellular life billions of years ago.'[227] It is in fact this essence that Holub infuses into his old woman on the express train to Vienna in 'Creative Writing.' This is an example, perhaps, of the very thing that Birkerts references when saying that soul is something recognised in language. Bloyd says of this poem that creative writing, 'a weary, academic term,' is 'resuscitated and reenvisioned…as a necessary, death-defying act.'[228] Though it is acknowledged in this poem that the woman's ending will be drawing near in the not-too-distant future, that she is as condemned to her ending as the last cell, as with the last cell, that is not the whole story. '[I]n the poem she writes. Present tense. The fluid soul continues.'[229]

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[225] Holub (1990), p. 379.
[226] Ibid., p. 379.
[227] Ibid., p. 379.
[228] Bloyd, R. (2008). 'Translator's Note: Creative Writing.' [Online] Available: http://www.poetryfoundation.org/poemcomment/181310. [Last accessed 29 Feb 2016].
[229] Bloyd (2008).

> The unknown, through poetry, is language. Each poem is an experiment to see if language can convey a shapely sense of the swarm of energy buzzing through the mind.
>
> —Alison Hawthorne Deming[230]

> The seat of the soul is where the inner and outer world meet. Where they overlap, it is in every point of the overlap.
>
> — Novalis[231]

> Metaphor is made by mixing the experiencing self with what is outside of it.
>
> —Jane Hirshfield[232]

Poetry can interact with science by sharing its language, its imagery, and its myriad and fascinating subject matter, and also by its methods. These methods must, however, be translated to include the raw materials of poetry—that of words, images, metaphor and musicality—in order for poetry to effectively communicate rather than simply imitate. The poems I discuss herein by Smith, Rogers, and Goldbarth, among others, operate as hypothesis, experiment, and quantifier, each proposing, exploring, and measuring the contents of the human soul, the contents of a human life, and the mysteries of experience that refuse to conform to easy classification. Through their own methods of investigation, these poems go beyond quantification limited to numerical value and provide the reader with a vessel of words to assess a certain meaningfulness that is categorically cast into parenthesis by other appraisals.

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[230] Deming, A.H. (2001) 'Science and Poetry: A View from the Divide'. *In:* K. Brown ed. *The Measured Word: On Poetry and Science*. Athens, Georgia, USA: University of Georgia Press. p. 188.
[231] Novalis (1798) *In*: Bly, R. ed. *News of the Universe: Poems of Twofold Consciousness.* San Francisco: Sierra Club Books. p. 48.
[232] Hirshfield, J. (2012) 'The Circular Path'. *In*: Kaminsky, I. and Towler, K., eds. *A God in the House*. p. 54.

Though I am stating here that poetry seeks to hypothesise, to quantify, to measure and name, and to conduct experiment, these operations are not undertaken in the same way as they are in science, nor will their ambitions be the same. As with Dickinson's experiments, they are intended to deepen the mystery of existence, rather than 'solve' it. However, as the focus of this chapter is quantifying, it is necessary to differentiate the sense in which I mean this term from empirical science.

Quantification is generally the operation of counting and measuring the results of observation, and then assigning a numerical value. Quantification immediately invokes authority in the current culture; in fact 'The authority of modern physics rests on its capacity to quantify and calculate material substance,'[233] as Tiffany points out. However, while, 'reality is understood to be mathematical', 'numbers, which are entirely devoid of quality, can provide only the most tenuous approximation of intuitive experience.'[234] Additionally, even physicists have come to recognise that their field is insufficient to examine the entirety of reality, exactly because of the limitation of physics, whose 'subject matter is deliberately chosen so as to be amenable to quantitative analysis' (Ziman, J. (1978), p. 28, in Midgley, p. 195). Ziman adds, 'There is nothing fundamentally wrong with physics as such, but it is an inappropriate model for all consensible and potentially consensual knowledge.'

The raw material of poetry is not numbers, but language. As Jonathan Holden explains (1986), both numbers and poetry are languages unique to each other, evolved for different use:

> just as number is a specialised language that has evolved to express quantifiable values, poetry is the specialised language that has evolved *to express synthetically otherwise inexpressible aesthetic values and experience*.[235] (emphasis mine)

[233] Tiffany, p. 287.
[234] Ibid.,, p. 287.
[235] Holden, p. 96.

Holden goes on to explain that:

> the specialised capacity of poetic language, like mathematical language, [is] to *measure accurately and thereby to find names for areas of experience* that would have otherwise eluded us.[236] (emphasis mine)

Holden gives examples such as the transmogrifying descriptions of light in Wallace Stevens' 'Sea Surface Full of Clouds'—that, so accurately described, present and capture entirely different atmospheres of experience (which he calls untranslatable)—and Gerard Manley Hopkins' 'Binsey Poplars', which contains what Holden asserts to be 'the single most sufficient description in English that we will ever have of the peculiarly arresting motion of aspen leaves and their shadows in a light breeze.'[237] These poems both measure and capture parts of life that are simultaneously fleeting and familiar, significantly magical and gone in the blink of an eye. They cannot be bottled, weighed, or even captured sufficiently on film, if documented. By choosing the most precise descriptions the poet has available within his imagination, by choosing the most unique and specific combinations of words to capture an image, and by combining these images (such as 'rosy chocolate', 'gilt umbrellas', and 'Paradisal green' from Wallace's poem), they form a new compound that did not previously exist, in, as Holden calls it, the 'laboratory' of the 'poet as word-scientist.'[238]

But how does the poem measure the experience, the meaning, in a way that is resonant and quantifiable, in this sense? Holden elaborates on a way this is possible, in terms of ratio:

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[236] Holden, p. 97.
[237] Ibid, p. 104.
[238] Ibid.,, p. 96.

> …in other words, for measurement, for a ratio to alert us to its significance, it must refer to our expectations and to our remembered experiences, and it must play off them.[239]

What this means in terms of numerical value is that unless we understand the relative size of a centimetre or an inch or a mile, larger or smaller measurements will have no meaning (300 miles, or half a centimetre). For poetry, ratio is something that language can access in terms of other varieties of comparison. Holden discusses the nature of prosody in this sense (with the example of highly metrical verse in comparison to prose), but also recognises that the 'beauty of good poetic language can have its source in any number of different kinds of "ratio."' An important ratio in poetry comes from the collective trove of imagery, words, and concepts shared amongst a potential readership – a ratio of meaning.

Science, in turn, functions as a body of factual knowledge and agreed-upon meanings characteristic to its narrowing of definitions—the aforementioned bones. As a bank of shared information, is an essential and rich source of material for poetry to employ. In terms of ratio, under Holden's sense, science acts a common map that runs beneath the experiences of most of the educated world. This was specifically evident during the late-nineteenth century atmosphere in which Dickinson and Whitman wrote, as well as throughout the physics-saturated twentieth century under which Middleton's poets wrote. Holub understands well the unfolding possibilities of science for broadened simultaneity and communication:

> [T]he present scientific paradigm and the organisation of modern science provide a precise and lasting world memory and link distant causes to distant effects. They offer an operational framework of memory.[240]

Certainly this must be a benefit for Bakhtin's heteroglossia, that there is this world memory framework. With new discoveries readily populating this framework, there is

[239] Holden, p. 101.
[240] Holub (2001), p. 53-54.

a continually renewing font of scientific ideas and imagery that comes into the collective cultural memory and dialogue. Scientific language is, however, less boundaried by local social, cultural, and even religious frameworks, providing an opportunity for a global ratio of meaning. Science tells the same story of all of our bodies, from cell to nervous system, and the cosmological story for our beginning encompasses us all, which again provides a shared memory bank that also offers unity.

Following on from 'Not God, Exactly,' Tracy K. Smith continues to refute the pinning down of an exact word or definition for the mystery of everything we experience as beings, what could be God, or could be the spiritual aura of existing in this universe. She even calls this force or being 'It,' in her poem 'It & Co.' But her first line introduces her hypothesis: 'We are part of It. Not guests' – the attempt is made to introduce perimeters. 'It,' God, the universe, whatever 'it' might be, is both qualified and quantified (in beautifully oblique manner) in terms familiar to science, mathematics, and cosmology, as well with as a nod to traditional religious texts. Though Smith asks, 'How can It be anything but an idea,' she describes this idea as 'Something teetering on the spine / Of the number *i*.' In this sense, she attempts quantification by demonstrating the nature of 'It' as unquantifiable in the usual sense: the number *i* is the figure used to represent a complex number in mathematics called an imaginary number. An imaginary number is one that can't be conceived of in actuality, and more specifically, it functions as 'Designating a quantity that can be expressed in terms of the square root of a negative quantity.'[241] It both quantifies the very unnameable 'something' that she is also attempting to name through the poem,

[241] 'imaginary number.' n. OED Online. March 2016. *Oxford University Press*. [Online] Available from: http://www.oed.com/view/Entry/91640?redirectedFrom=imaginary+number [Last accessed 27 April 2016].

by being a number that doesn't technically 'exist,' but also qualifies the very nature of this immense and shifting entity that defies classification. The 'number *i*' also represents the personal 'I', the self, upon which 'It' teeters. There is correspondence in this reference to the consciousness or soul existing where inner and outer meet—perhaps this is where we shall meet 'It', also.

Through the poem's use of conflicting descriptors—'It' being something so 'Vast and unreadable' that it contains us all, yet it can teeter 'on the spine'—we are given a picture of something or someone whose characteristics are so paradoxical that traditional notions of measurement lose their meaning entirely. Rogers' surprising image of the Atom-Angel returns to mind. As Smith says, 'It avoids the blunt ends / Of our fingers as we point.' This is something that forbids quantification by its nature – its nature is one that is too large to contain and too integrated to cut away from all else, in order to count—perhaps even too small to detect, like a neutrino. We cannot even be sure of its boundaries: 'Is It us, or what contains us?' Yet the poem captures this enigmatic entity so well by the end we begin to be certain we understand it. Worth noting, also, is Smith's use of the first person collective pronouns 'We' and 'our' throughout the poem, including as well as implicating the reader: 'We / have gone looking everywhere.'

The hunt for 'It & Co.', unnameable as it is, is longstanding. Both scientific and spiritual seekers are looking for it, 'In Bibles and bandwidth, blooming / Like a wound from the ocean floor.' There is tradition in seeking the mysterious, the ineffable, through religion, hence the reference to the Bible as symbolic of this method. However, the reference to bandwidth is indicative of radio and microwaves, potentially signifying the study of astronomical objects (especially with Smith's links to astronomy via her father, as well as astronomy functioning as a major theme in the

collection), and very likely cosmic background radiation. First detected by astronomers Arno Penzias and Robert Wilson in 1964, cosmic microwave background radiation is essentially the light left over from directly after the Big Bang. The first comprehensive image of cosmic background radiation was published in 1992, but a much clearer, more recent image was released in 2013 by the Planck space observatory (operated by the European Space Agency). This image gives astronomers a powerfully accurate picture of the period when atomic recombination first began to occur after the Big Bang, and where the seeds of galaxies in existence today initially appeared. It is a map of our beginnings, as tiny fragments of this universe. The observatory is named for Max Planck, a German theoretical physicist who is credited with originating the theory of quantum physics. These waves were found as a result of us searching for our origins, asking where we came from, and looking and listening for an answer from where 'It' all began. Planck himself was, it is worth mentioning here, a scientist who did not ascribe to scientism, and saw the whole picture of reality as much bigger than what scientific practice was capable to including. In a collection of essays by Planck published in 1932, with a prologue by the great Albert Einstein, Planck asserts:

> Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of nature and therefore part of the mystery that we are trying to solve. Music and art are, to an extent, also attempts to solve or at least to express the mystery. But to my mind the more we progress with either the more we are brought into harmony with all nature itself. And that is one of the great services of science to the individual.[242]

In many ways, Planck words seem to echo just what Smith has evoked in her poem—the ultimate mystery cannot be solved by us because 'It' contains us. And, as Smith concludes, it 'Still, it resists the matter of false vs. real.' The matter of 'false vs. real'

[242] Planck, M. (1932). *Where is Science Going?* New York: W.W. Norton & Company, Inc. p. 217.

is one that persists, especially within the tenacious attitudes of scientific materialism, and its contradictory definitions of the real that yet exclude all other ways of discovering it. 'It' may continue to resist the common measuring devices of our world, our methods, and our language – except possibly in fleeting moments of poetry, or music, or art. Perhaps they will not solve the mystery, but as Planck proposes, they may express some of the mystery. Yet as he also suggests, progressing in both endeavours brings us a bit more in tune with 'It,' and science is no small part. Both paths possess the ability to reveal new knowledge in different ways.

Rogers reminds us (2001a) that 'science is in the business of measuring things,' and in turn the model of the universe that it creates is built entirely from what it is able to measure. But Rogers reckons that, much like Smith and Planck above, for this very reason the model science creates cannot be the entire picture—despite its picture being a vital and necessary one. In fact she calls it 'a fallacy of misplaced concreteness…to proclaim that this model is total reality.' Rogers adds that 'The model is not untrue, but only partial, not all-inclusive. […] Total truth has not yet been discovered.'[243] In fact, though approached often to discuss her inclusion of science in her poetry, Rogers has said she feels that 'science' as a term specifically isn't entirely accurate to where her interests lie. She shares, in an interview with fellow poet Jeanine Hall Gailey for *Poets & Writers* (2008), that instead what inspires her is 'cosmology, the story behind the physical world, being told by scientists.'[244] This narrative is one that Rogers asserts most people accept and to a degree make decisions based on, and one 'that affects our definition of spirituality and what being human means.' This story of cosmology not only affects these essential definitions, but, as Rogers discusses elsewhere in her essay from *The Measured Word*, it 'creates

[243] Rogers (2001a), p. 10.
[244] Gailey, J.H. (2008).

the structure upon which we locate ourselves and define ourselves in relation to the objects we observe around us, and by which we also address our own origins and our nature.'[245] One could conclude from the amalgamation of these ideas that science is both a limited structure of reality, yet also one that is essential to how we define, locate, and measure our spirituality and our experiences as human beings. We must investigate the view that science's story, cosmology, provides to see what lies beyond it. And for the purposes of poetry that quantifies what is 'unquantifiable' about experience, the structure of science helps to create the vessels we use to cup and contain these measures of ourselves, these measures of the word.

Pattiann Rogers' poem 'Life in an Expanding Universe'[246] (1994) is in the business of measuring the very expanding universe pointed to in the title, and more, opening with the use of figurative language that provides its ratio of meaning. This figurative language gives the reader reference points, images we recognise and understand, images that carry an emotive significance, as qualitative information in order to clarify the larger concepts: 'cosmic / pinwheels….spin around / like the paper kind tacked to a tree trunk…expel matter and light / like fields of dandelions throwing off / waves of summer sparks in the wind.' This poem in its entirety is the hypothesis, from the statement at the start of the poem to the end, perpetually aligning cosmic concepts alongside smaller, more recognisable units in order that the overall measurement of the expanding universe is made distinct.

The second stanza leads the reader further towards terrestrial climes, whilst also tallying the enchantments of the observed world again through Rogers' use of figurative language, here dwelling more in metaphor than simile: the crow noisily 'making / new multiple canyon spires in the sky / by the sharp towers and ledges / of

[245] Rogers (2001a), p. 2.
[246] Rogers (2001b), p. 413.

its calling'; the bison expanding their meadows as the 'cosmic pinwheels' of the initial stanza do, 'by repeating / inside their watching eyes every foil / of columbine and bell rue, all / the stretches of sedges.' Here Rogers even uses grammatical quantifiers indicating number such as 'multiple,' 'every,' and 'all' to amplify the poem's tallying capacity.

The final stanza, however, is most significant to my discussion of how poetry can use its language to quantify the unquantifiable nature of experience. Rogers begins the stanza with the subordinate clause, 'And though there isn't a method / to measure it yet'—knowing and stating that what she is about to measure by her words does not yet have a conventional method of recognised quantification. What she then measures is the change in her 'presence,' the very condition of her being, that occurs through the processes of 'finding,' 'seeing,' and imagining – experiences of the soul in contact with something larger, the inner and outer worlds meeting and mixing. The speaker in this poem sees 'a blue whiptail streak / through desert scrub,' and through this instance, and 'by looking up / one night and imagining the fleeing motions of the stars themselves,' she begins to register, name, and quantify the changes she feels as a result of the experience, a change that will last from the point of the experience into the future:

> I know
> my presence must swell one flutter-width
> wider, accelerate one lizard-slip farther,
> descend many stellar-fathoms deeper
> than it ever was before.

These hyphenated dual-noun descriptors link directly back to the three experiences recorded in the stanza, but also contribute more than that to the poem's quantifying power. The creative power necessary to imagine them, the aligning of both the

experiencing mind, the imagining mind, and the 'categorising mind' consequently forms new connections into the world of her experience, as well as ours, the reader's.

This experience detailed in Rogers' final stanza reflects back to Holub's 'common denominator of quality' in both poetry and science, that of 'a little discovery' that has its impact, which it carries forward and changes within us after the fact. This very discovery is what Rogers quantifies the effects of at the end of 'Life in an Expanding Universe.' This is the 'richly felt illumination'[247] that Frank remarks is the characteristic of sacred experiences, and it is the impact, the irrevocable change that marks a spiritual experience as defined by science journalist and author Barbara Bradley Hagerty[248] (2009) in *Fingerprints of God: What Science is Learning About the Brain and Spiritual Experience*, which examines the impact of sacred experiences on the brain. This transformative experience also reminds us of metaphor's ability to rewire the brain, indicating that language, precisely and imaginative used, can invoke change.

Nadya Aisenberg, in her poem 'Sum', anthologised in *Verse & Universe: Poems of Science and Mathematics* (1998), considers the possible repercussions, both spiritual and otherwise, of dividing the universe to make our measurements. Her poem begins with the lines: 'Early atomists like Lucretius believed in unity, / seeking not to dissect the world but to imagine it.'[249] With the poem's epigraph from Brian Appleyard establishing directly the premise that science corrupts and destroys nature via its method of isolating parts, we know this is a concern under consideration entering the poem. The notion that we are looking for something more than matter to

[247] Frank, p. 9.
[248] Hagerty, B.B. *Fingerprints Of God: What Science is Learning About the Brain and Spiritual Experience*. New York: Riverhead Books, 2010. p. 35.
[249] Aisenberg, N. (2001). 'Sum.' *In*: Brown, K. ed. *Verse & Universe: Poems About Science and Mathematics*. Minneapolis, Minnesota, USA: Milkweed Editions. p. 105.

measure resounds in the line, 'Ever more accurate, we weigh the world for proof.' Aisenberg voices the concern that we are asking questions of the world through the precise measurements of our incisions into matter that perhaps it cannot answer. The instruments are accurate, but are they fair or honest or kind? Aisenberg asks, 'what if matter, weighed piece by piece, / doesn't add up to a whole we can describe' and we meet not the unknown but the 'unknowable'?

Aiseberg closes the poem on the image of the archangel Michael in Memling's painting of The Last Judgement, bringing back the 'balance pole with its brass pans' from earlier in the poem. Here Michael is 'no scientist,' but the one 'who does the weighing,' counting the bodies of those who would be measured suitable for entering heaven. These figures, Aisenberg describes, are 'strangely small,' and 'buckling / backward before his sheathed and gleaming power.' Aisenberge chooses this image to illustrate in an approximating image the very 'unknowable' thing mentioned just prior. The value of what is being measured haunts us, because it is our very selves, and what is met in the process is something we cannot fully comprehend in the presence of what we understand to be a holy figure.

Rogers addresses this concern as well as the inverse. But Rogers does not limit this dissection to science, leaving scientific method to carry the full burden of culpability. Instead, she includes literature as well:

> Any effort to investigate the universe, whether science or literature, involves making a cut in the universe, interrupting its wholeness and unity, and therefore disrupting and ignoring the interconnectedness of all things.[250]

Both science and literature must take a small measure of the universe at any given time, as the vastness would otherwise be, as Smith says, 'unreadable.' Again, we are

[250] Rogers (2001a), p. 11.

reminded of Midgley's maps[251] and aquarium windows[252]. Yet there is promise in the process of making connections, in imagining, to again make whole. Rogers reminds us of the words of Bronowski (1978, in Rogers, 2001a), 'The act of imagination is the opening of the system so that it shows new connections.'[253] The freedom a poem has to imagine these new connections, via experiment, imagery, metaphor and dialogue, and to display them through possible ratios of meaning to a comprehending 'Thou', means there is healing power in the poetic imagination. This is the first step towards knitting the universe back together, to closing the incisions made through our investigations. Rogers again references Bronowski, reminding us that the healing imagination is not limited to poets:

> The creative person, whether scientist or artist…is that person who imagines new, different connections, broadening our conception of the universe and its interconnectedness as a whole.[254]

Science has every opportunity and role to participate and inspire these new connections, and such participation is absolutely essential.

In Albert Goldbarth's poem 'One Continuous Substance,'[255] both the light in the poem and the substance of the human being at the centre of it, the boy and the man he has become, are counted each as one, a single continuous substance, despite the passage of time. Goldbarth includes, as he often does, specific details of scientific fact, vocabulary, and figures – light 'travels its famous 186,000 miles per second.' But here, this is not an arbitrary fact, nor any arbitrary collection of photons. This light is specific, temporally continuous; it has journeyed with the boy out of his childhood, out of the image in the first stanza of the boy exiting the forest, into the

[251] Midgley, p.134.
[252] Ibid., p. 141.
[253] Rogers (2001a), p. 11.
[254] Ibid., p. 11.
[255] Goldbarth (2007), p. 238.

moment as a man when he and his lover are interrupted making love by a phone call – the speaker's father has died. The, the light has traded places with the speaker: 'the sun / kept touching you, there, and there, where I'd been.'

What is being measured and named here is something far more than just the light, or the individual speaking in the poem, whose many selves are counted as singular by the universe. The poem captures something unnameable about the way we experience being and time. Goldbarth measures the continuity of some subtle part of our place in the sequences of the physical world in both the presence of the light and its transformations – 'the still gold bar / on the floor of the darkness' and the 'slant of morning light.' We are drawn outwards in perspective to 'the universe's point of view,' where the nature of light is drawn in comparison to us at this distance – to the universe, we behave the same way, despite inescapable elemental differences from our own perspective. This poem's thread of connection between the speaker's very personal moment and the larger cosmic context of the experience manifests Blaser's definition of 'the fire,' that spiritual element of the text, in its 'translation of the personal to correspond with larger and larger elements.'

In 'The History of Buttons,' Goldbarth resorts to quantifying in the literal sense as a method of coping in the face of uncertainty. The poem starts out calculating time in the usual way: the speaker in the poem tells us that the evening hours are passing: six, seven, eight. But the poem moves focus from definable measure to the physical world losing its definition: 'it is the time of objects, even bodies, giving definition / back.' This is the pathway down which Goldbarth takes us to quantum physics, where the very same is true, but via a detour through an art history book and the minutiae of button counting. It begins with 'one / bone-white button Renoir has given Madame Renoir', which Goldbarth would assert holds everything together ('if

you unbuttoned it, / everything unbuttons'), and runs through the poem's counting up various buttons in other painted works of art. It seems these buttons are also holding something more together: the speaker is depending on these buttons during the still night, where he is alone and his partner sleeps, to prevent his reality disintegrating.

The opening of the poem's second section pulls us out of the painting, and into the painting studio where the artist has 'set aside his tubes / that were curled like a dinner of fresh shrimp' – the artist leaves and 'the light of the studio dies.' Here, again, we have the light that stops and dies, and we have the light that continues. Goldbarth's informs us that the light that continues is 'the light of physics,' which:

> goes on
> unthinkably, it curves time, it
> goes all the way to where there's God or no God
> then loops back and doesn't
> care what it holds and it holds everything,
> and physics says in places light can untie like a knot
> sink backwards into itself, and undo down
> to units the mad couldn't see or the seraphim tally…[256]

The light of physics echoes here back to the 'It' of Smith's 'It & Co.,' through its comprehensiveness, its ability to hold 'everything.' Where light visits, though, in this colossal distance that it travels, is a place where all becomes uncertain, a place where the uncertainty principle applies even to God. Goldbarth uses God as a ratio of meaning here, also, as the existence of God is familiar question to nearly any seeker, spiritual or otherwise. Further reference to religious ideas are introduced when Goldbarth tells us that light has the power to break down into 'units the mad couldn't see or the seraphim tally.' Seraphim are familiar as high-ranking angels in Judeo-Christian iconography, and we are meant to understand here that these creatures, along with the 'mad,' can see and count what we cannot, and even they cannot

[256] Goldbarth, A. (1991) *Heaven and Earth: A Cosmology*. Athens, Georgia: The University of Georgia Press. p. 73.

quantify the nature of the light of physics. Goldbarth uses this to demonstrate the maddening quality of the 'intangible conundrum' that is quantum physics, that is faith, that is existing in the solitude of night knowing that 'the skin of anything is mainly empty space, a little / subatomic rhumba, mainly empty space.'

At the close of the poem, we are brought back around to the buttons, to the solid and determinate image of the '"first" "true" button rising / out of the Danish Iron Age peat' along with the female body of its wearer, preserved almost entirely though she has been beneath said peat for 300 years. Her preserved figure is, according to Goldbarth, 'what we are, when what we also are / is gone.' What we 'also are' is defined and measured here by its absence. Goldbarth closes the poem also by reintroducing time as commonly quantified: 'At 3 a.m. it means /a man should close a book.' The speaker in this poem then chooses to finally join his sleeping lover, and 'love what there is / in a living surface, love what it means to be here / at the end of uncountable miles of lacelike nerve.' Though in theory he 'knows' that the lover's skin is 'mainly empty space' according to physics, it does not feel like empty space, but a 'living surface.' And what he finds is an experience that is meaningful, that he can love and feel, at the end of an unquantifiable distance of the parts that make us, where time hangs like a button by 'precious' and 'pitiful threads.'

What Goldbarth's speaker in 'The History of Buttons' struggles with is what Tiffany calls 'the "abyss of images" into which our bodies disappear once they become the properties of modern physics,'[257] or the 'inchoate image of the observer hovering over "an unfathomable depth"'[258] proposed by Heisenberg when regarding the problems of perception posed by quantum physics. Though the idea, per

[257] Tiffany, p. 246.
[258] Middleton, p. 75.

Heisenberg, is that poets can make this more intelligible, it would appear from Goldbarth's perspective the abyss itself is the problem.

Goldbarth's poem 'Units'[259] opens by announcing, with some fair level of irony, specific units of pain: 'This is the pain you could fit in a tea ball. / This is the pain you could pack in a pipe.' There is also '*this* pain you could pour down the city sewers, / where it would harden, and swell, and crack those tubes' and yet more would arrive at the source. The poem uses a ratio of meaning through these images, providing quantification of an abstract term by way of their familiarity: we know the size of a tea ball, a tobacco pipe, a city sewer, though for pain, 'No ruled lines exist by which to gauge its growth.' Goldbarth does not limit the measurement to the pain itself, but also measures what is needed for its resolution: for some 'the only true measure is litigation' but 'For other pain, the glint of the lamp / in a single called-forth tear is enough.' These descriptions would not be sufficient quantifiers to stand up in aforementioned litigation, yet through Goldbarth's poetic language and use of imagery, we understand exactly what amounts of each he is referencing.

Later in the poem, which is one continuous stanza, a column of long lines like an unending pang, Goldbarth journeys further back in art history to Rembrandt, who is introduced to act as a qualifier of pain. Goldbarth guides us to notice, near the end of the series of Rembrandt's self-portraits over his life, one specific image that reveals 'a kind of pain / so comfortable it's worn, at the last, / like a favourite robe.' The image is Rembrandt's self-portrait from 1658, where his 'gaze is equally / into himself, and out to the world-at-large.' In this image, which Goldbarth describes as 'recorded / with a faithfulness, with really a painterly tenderness,' this meeting of inward and outward gaze manifests in what Goldbarth also unexpectedly classifies as

[259] Goldbarth, A. (2007) *The Kitchen Sink: New and Selected Poems, 1972-2007*. Saint Paul, Minnesota: Graywolf Press. p. 99.

'love': '"love" is the word / that seems to apply to these mournfully basso / bloodpan reds and tankard-bottom browns.' The faithfulness and honesty of the gaze that meets the self and the world simultaneously, and still maintains tenderness, could perhaps be both the definition of spirituality, and also that of love.

Perhaps Rembrandt's painting is, in the same way as a poem, ultimately 'against emptiness,' as Miroslav Holub declares in his own poem 'Although.'[260] Holub is keenly aware that the function of a poem is, in terms of practicality and accomplishment, useless. But as he appeals to us in 'The Last Cell,' it may be 'useless, but' is a 'nonetheless hopeful, hope.' – 'For a poem is when nothing else remains.' Jane Hirshfield, in her essay 'Poetry and the Constellation of Surprise' (2007), strikes somewhere in the middle of Holub's pendulum:

> While poetry reminds us of the usefulness of the useful, it reminds us as well of the usefulness of the useless. The reasoning of great poetry transcends reason because reason — a faculty rooted in the attainment of goal and its own perpetuation — cannot and does not encompass the whole of life.[261]

Empirical science receives some criticism also by Holub, in his poem 'Brief reflection on accuracy,'[262] which opens declaring the 'accurate built-in time sense / and orientation' of fish and birds. The second stanza informs us that 'Humanity…lacking such instincts resorts to scientific / research.' The rest of the poem goes on to reveal 'the nature' of scientific research via an anecdote wherein a clockmaker sets his clocks by the cannon fired on the hill, and the soldier fired the cannon every day according to his watch, set by the clockmaker's clock. It reveals the way that our perceptions of accuracy may not always be so accurate.

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[260] Holub (2006), p. 129.
[261] Hirshfield, J. (2008) 'Poetry and the Constellation of Surprise'. *Hiddenness, Uncertainty, Surprise: Three Generative Energies of Poetry.* Newcastle upon Tyne: Newcastle/Bloodaxe Books. p. 60-61.
[262] Holub (2006), p. 145.

The poetic experiment of Holub's poem 'Brief reflection on woman with a barrow'[263] adopts the framework of a mathematical equation, solving the system for the variable of truth. It assumes the language used in solving mathematical systems, but once again uses the tools of poetic imagery and metaphor to provide the necessary ratio of meaning. The poem opens defining the system: 'Given an old woman and given a barrow. / I.e. the system old woman O and barrow B.' The 'system' moves through various defined functions, such as 'the paved yard Y to the corner C, / from the Corner C…to the horizon H.' After the system is fully defined, the poem then begins to reveal the metaphysical nature of what it seeks to identify: 'The horizon H is the point where visions ends / and memory begins.' The system itself, that of the woman with the barrow, is 'constant' in terms of path, velocity, and destiny. And through solving this system, in the poem, Holub has solved for what he calls 'that geodetic unit,' which is also:

> unit of travel there and back, the
> unit of autumn, the
> unit Our daily bread, the […]
> unit As we forgive them, the […]
> unit of footsteps and dust, the
> unit of life-fulfilment Amen.

Through the imagery here, and also the referenced phrases from The Lord's Prayer which are defined as units of measurement themselves, there is the sense that what is measured is human experience—the passage through life, and the truth of our moments, the recognition of our trajectory and fate. The poem even ends as would a prayer, with the customary close of 'Amen,' though I think this is used paradoxically. Yet here in the middle between the two worlds of science and spirituality, we have system, solved for the most varied of variables, that of our being.

[263] Holub (2006), p. 148.

> By now it's no secret: scientific method,
> the Newtonian/Cartesian paradigm, isn't hauling ass
>
> and soul in happy tandem very well.
> —Albert Goldbarth, 'Reality Organisation'[264]

> I do, however, believe in the primacy of direct investigation and direct experience. This is where the sacred appears most convincingly.
> —Adam Frank, *The Constant Fire*[265]

> The mind, whatever else it is, is a constant of everyone's experience, and, in more and other ways than we know, the creator of the reality that we live within, that we live by and for and despite, an that, often enough, we die from. Nothing is more essential to us.
> —Marilynne Robinson, *Absence of Mind*[266]

Ryota Kanai and Naotsugu Tsuchiya (2012) define 'qualia' in their primer on qualia published in *Current Biology* as the 'phenomenal aspect of consciousness or 'what it is like' character of subjective experience,'[267] providing such common illustrating examples as the redness of red or the painfulness of pain. Because qualia exist 'only as viewed from the inside,' as they discuss, qualia are a difficult to study due to their subjective nature. There are two senses of 'quale', the broad sense that includes all details of a single experience, and the narrow sense that 'refers to elementary sensations that are indecomposable to smaller experiences, such as the 'redness' of red.'[268] Though it would be interesting to consider the narrow sense of qualia in terms of poetry, for the purposes here, the broad sense of qualia, the larger and more encompassing phenomenological event of a conscious experience suits engagement with poems in this research.

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[264] Goldbarth (1991), p. 101.
[265] Frank, p. 226.
[266] Robinson, p. 1.
[267] Kanai, R. and Tsuchiya, N. (2012) 'Qualia'. *Current Biology.* 22 (10): p. R392-R396.
[268] Kanai and Tsuchiya, p. R393.

As with any theory of the way our minds work, or with any theory in science more generally, there will be detractors and those who disagree, some more vehemently than others. In terms of qualia, there's a notably fervent detractor. Daniel Dennett, American philosopher and cognitive scientist (also known as one of the Four Horsemen of New Atheism), sets out to reduce and negate the term qualia in his 'Quining Qualia' (1988), with a gusto that seems born of resentment. Dennett announces off the bat that his 'goal is subversive,' that he is 'out to overthrow' the idea of qualia, pronounce there is nothing 'special' about qualia, 'destroy our faith in the…concept' and 'declare that there simply are no qualia at all.'[269] His tone belies a complete disdain for anything that is not reductionist and materialist, and he even chooses to be condescending towards Einstein at one point (claiming he was all wrong about science being unable to give us 'the *taste* of soup'[270]). He seems to wish to antagonise the reader, sarcastically asking, 'or haven't you been paying attention,' and is flippantly dismissive of previously defined characteristics of qualia by inserting the parenthetical 'whatever that means' after each of them listed in a paragraph (three separate times, presumably for effect).

But however distasteful one finds Dennett's approach and style, one would still need to ask if Dennett is convincing or successful. Even if one is to trudge through his fifteen 'intuition pumps' meant to 'flush out—then flush away'[271] what it would seem Dennett regards as so much waste material, the end result is that Dennett depends on the success of his argument by the very problematic method that plagues most parascientific literature: to 'answer certain essential questions about the nature

[269] Dennett, D. (1988) 'Quining Qualia'. *In* Marcel, A.J. & E. Bisiach, E. eds. *Consciousness in Contemporary Science*. New York: Oxford University Press. p. 383.
[270] Ibid, p. 386.
[271] Ibid, p. 383.

of reality, if only by dismissing them.'[272] His quest to lambast the idea of consciousness having these qualities of qualia seems more focused on defeating what he acerbically calls his opponent's 'last bastion of specialness be stormed by science'[273] rather than to methodically unpack his disagreement in a way that earnestly seeks the honest truth.

Dennett's treatment of much subject matter surrounding experience and belief can be readily classed as what Robinson decries as parascientific literature, or the current weapon of scientism (note: not science) against the complexities of mind and experience. Robinson revisits Dennett's definition of religion (a social system and its participants) and once again contrasts his limited notion to the universal focus of William James and James' inclusion of the personal experience, mentioning the 'insistence in Dennett's writing on the demographics of religion, on what, by his lights, is observable and therefore accessible to science as he understands it.'[274] For Dennett, only what is observable in terms of religion exists. This very insistence on what is observable and therefore accessible to Dennett's understanding of science is also what causes his arguments against qualia to fail:

> Dennett sheers off the contemplative side of faith, its subjectivity, as if the collective expressions of religion and the inward experience of it were nonoverlapping magisteria, as if religion were only what could be observed using the methods of anthropology or sociology, without reference to the deeply pensive solitudes that bring individuals into congregations and communities to be nurtured by the thought and culture they find there.[275]

This sheering off of subjectivity is not only problematic in terms of Dennett's definition of religions, but also in terms of the internal, subjective, personal human

[272] Robinson, p. 50.
[273] Dennett, p. 386.
[274] Robinson, p. 8.
[275] Ibid, p. 9.

experience altogether. What seems to be consistent in terms of conflict between areas of thought that value and include the subjective experience (spiritual, literary, amongst many others) and those that do not is this perpetual arrogance of the final word. As Robinson advises, one way that 'it often achieves its effects [is] by misrepresenting an earlier state of knowledge or simply failing to inquire into it.'[276]

Robinson also discusses James L. Kugel, who proposes that a modern reader approaching the flood stories in the Epic of Gilgamesh would respond with incomprehension and derision at the idea of taking any 'lessons' from such a story for daily living because 'it was written by a bunch of Mesopotamians four thousand years ago!'[277] And, he follows on, if that same reader turned to the book of Genesis and found it meaningful, 'such a person is either being dishonest or has imply failed to recognize a fundamental fact.' Robinson's rebuttal is entirely relevant, that simply due to time frame a work does not lose its value, or ability to speak: 'We are entirely in the habit of finding meaning in the writings of ancient India or China or Greece. We are also familiar with the literary allusion.'[278]

It also seems reductive to state that any person finding meaning in one text over another is *only* either being dishonest or voluntarily ignorant. Kugel's statements echo Dennett's assertion in his quining of qualia that so many are 'unwilling' to take on his 'radical challenge' because they simply want qualia to be real, and are otherwise ignoring the truth.[279] This habit of logic seems to be recurring. One does not see this habit as often in genuine science, in the terms of Brown's Latin-derived 'to know.' Much of science, well-practised, would assert 'this is what we know now, until we know more,' and continue to ask questions. The attitudes of Kugel and

[276] Robinson, p. 27.
[277] Ibid, p. 24.
[278] Robinson, p. 25.
[279] Dennett, p. 386.

Dennett strikingly resemble the very religious dogma that many a 'modern,' parascientific thinker claims to despise: to unquestioningly assert a final rock over the tomb of knowledge in the form of any final answer.

Dennett said that if he were successful the use of the term qualia would be seen as quaint, insupportable, and even ludicrous. However, more than two decades later, Kanai and Tsuchiya's primer on qualia examines the continued consideration of this phenomenon of consciousness in the field of neurobiology, and its impact on our understanding of individual human experience and the scientific understanding of consciousness. They acknowledge its mysteriousness, but also recognise that 'for conscious animals like us humans, the existence of qualia is real and from a subjective viewpoint, qualia of hunger, pain and perception are central to our existence.'[280] As Robinson has already pointed out prior to the opening of my chapter, qualia is what we live within and because of, despite, and also what we die from. The very character and quality of our experience as a human being is what defines our reality, and more than that, what helps to give our lives meaning. Poetry, then, as a body of work, and as a process, that embraces the human experience of reality as significant, as well as contributes to the meaning generated from those experiences, is an essential venue for the consideration of qualia.

Clear now are the conditions for dialogue to happen across the permeable boundaries of poetry, science, and spirituality, and these are not where lines are hardened by arrogance, dogma, and unwillingness to listen. This is not limited to the science-aligned, such as Dennett. One must only even briefly turn to history's tragic and iniquitous accounts of Copernicus, Bruno, Kepler and Galileo for proof that the side of religion, at least in terms of the organized structure, has perpetuated its share

[280] Kanai and Tsuchiya, p. R393.

of dogma. As Barbara Brown Taylor concedes,[281] 'Science has its own dogma and divisiveness, of course, but so far as I know there has been no bloodshed over quantum mechanics or chaos theory.'

Carl Sagan, the first of the great science evangelists, also an accomplished astronomer in his own right, considers the way that certain religious dogmas reject science in various ways, especially by the path of selective ignorance in the name of belief. His response is that while he believes it is 'true that humility is the only just response in a confrontation with the universe,' that it is 'not a humility that prevents us from seeking the nature of the universe we are admiring.'[282] He goes on to propose that even in the context of the existence a traditional deity, it would be unappreciative to disuse the curiosity and intellect inherent in our beings. What Sagan suggests also is that 'science is, at least in part, informed worship.' By seeking after the nature of our universe and asking questions of its character, and being willing to listen to the answers, we demonstrate both the openness and inquisitiveness that allows for dialogue that 'interacts with us across the fixed borders of our skins.'[283]

Part of that openness concerns one's response to uncertainty and mystery, no matter from which of the three directions one's perspective originates. Frank ties the appreciation of the mystery into the pathways of both science and spiritual seeking, reminding us that 'We must keep asking the question, but…we must, ultimately, be content with the mystery.'[284] Poetry, too, must exist in this middle space, but then poetry tends to have a natural proclivity to linger there. Jane Hirshfield provides an insight into poetry's abilities in this area, specifically through subtlety and clarity, in

[281] Taylor, p. 26.
[282] Sagan, C. and Druyan, A. (2006) *The Varieties Of Scientific Experience*. New York: Penguin Press. p. 31.
[283] Goldbarth (2004).
[284] Frank, p. 226.

'Poetry and Uncertainty' (2008). Hirshfield hearkens back to Keats' Negative Capability, which he defined as 'when man is capable of being in uncertainties, Mysteries, doubts, without any irritable reaching after fact and reason.'[285] As addressed in Part I, the response of the Romantics to the scientism of the era was not to science itself, but to finality and reductionism. Hirshfield, too, is not advocating anti-science sentiment but asking for acceptance of uncertainty to allow future possibility—as is evident in her discussion of subtlety and clarity in terms of poetic language.

Specific to how poetry handles uncertainty, as mentioned, are clarity and subtlety. Hirshfield first introduces and defines subtlety by way of the following:

> Subtlety's etymological roots rest in loom-woven cloth. It is the name we give to thought that is both finely textured and free of range, able to connect disparate qualities into the unified, usable fabric of a new whole. Respect of the uncertain is subtlety's inscape.[286]

But, Hirshfield cautions, 'to find the places of openness is not to be vague.'[287] The sinuous boundary, here, is where mistaken impressions can occur of poetry and of the need for mystery's inclusion. This is not a suggestion for wilful ignorance.

Far to the contrary, and this is where what Hirshfield calls 'clarity' comes in, which could also be considered precision: 'Clarity is factuality that looks and feels more widely, letting in more than it knows it knows…the combination of attentiveness, accuracy, and permeability to subtlety's undertone and shadow that we recognise in good poems.'[288] Hirshfield's clarity has the essential dual nature required to entertain both precise and accurate information and the very acceptance of mystery needed for continued receptivity. Without this permeability, in a mind-set or a poem,

[285] Hirshfield (2008), p. 27.
[286] Ibid., p. 31.
[287] Ibid, p. 32.
[288] Ibid, p. 32.

something is missing, and Hirshfield explains that this 'difference between clarity and objectively graspable fact is the difference between a live blue Morpho and one pinned for display.'[289] Though our biologists may one day nail down what exactly animates a living thing, and though we have many windows into the very biological processes that make these movements possible already, the difference here is still revelatory. It is Einstein's *taste* of soup.[290]

This also does not mean that science, and objective facts that come from science, are to be shut out from our experiences' meaningfulness. Nancy Gorrell, co-author with Erin Colfax of *Writing Poetry Through the Eyes of Science: A Teacher's Guide to Scientific Literacy and Poetic Response* (2012), writes of how a memorable experience as a young child inspired her on her path towards exploring the meeting point of poetry and science.

On a New Jersey beach at dusk in the late 1950's, Gorrell went to collect shells. What she found was a sight entirely unfamiliar, mysterious, and beautiful to her, so much so that as the yellow-green sparkles all over the beach and the waves covered her feet, she danced for joy. She describes it as 'an encounter with the universe that has stayed with me to this very day.'[291] She felt it was a gift, an experience that changed her and the course of her life. Gorrell wrote a poem years later after this encounter, but even for years after that, the poem, she felt, was lacking something and felt incomplete. When she finally discovered scientific information about bioluminescent algae, or phytoplankton, which created the glowing yellow-green sparkles on that New Jersey beach many years prior, it at once solved a certain part of the 'mystery,' but it also gave something more to the poem and the writer

[289] Ibid, p. 32.
[290] Dennett, p. 386.
[291] Gorrell, N. and Colfax, E. (2012) *Writing Poetry Through The Eyes Of Science*. London: Equinox Publishing Ltd. p. 7.

herself. She was able to 'finish the poem.'[292] She was given word choices that revealed 'a greater truth' because these were 'scientifically true to the phenomenon of bioluminescent algae,' but 'also poetically true to the language of that experience.'[293]

As Gorrell points out in her example of the poem she created from her experience with glowing waves at night in New Jersey as a child, gaining the knowledge of the phenomenon from science allowed her to acquire the more precise language needed to improve the poem where words felt false. The gift here was clarity. Additionally, this accurate information about the phenomenon did not spoil her mystery or awe from the experience. In fact, the more she learned, the more the experience deepened for her, and the mystery expanded. This phenomenon of the bioluminescent algae is common to Florida and Puerto Rico, and not in the region of her childhood experience.

Even if this was explained, however, Gorrell finds that the more she knows, she will 'still revel in the mystery of the universe,'[294] and the confluence of poetry and science is a natural seat for the seeker in herself, 'the part of me that wants to know, learn, and discover.'[295] For Gorrell, 'science and poetry are equally informative guides to knowledge and enlightenment, their fusion a natural consequence of the quest to make the unknown, known.'[296] Gorrell's estimation of this fusion reiterates Frank's central premise of *The Constant Fire*, the aspiration shared between science and spirituality. The meeting place for all three of these impulses finds a meeting place in human experience, once again.

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[292] Gorrel & Colfax, p. 10.
[293] Ibid, p. 11.
[294] Ibid, p. 11.
[295] Ibid, p. 8.
[296] Ibid, p. 11.

'The Golden Wall' by Geoffrey Lehmann (1994) frames the examination of Olber's Paradox within the narrative that recounts the life and habits of the speaker's own Uncle Pat, who would 'fix you with sheep drench if you told him / that his line of sight / should intersect at every point / with a near or distant star.'[297] As the poem elaborates, Olber's Paradox is an astronomical riddle that states 'the whole sky / should be ablaze from end to end / like a 'golden wall.'' Uncle Pat himself favours experience over knowledge, which is why this poem is so helpfully representative of the intersection examined within this research.

The poem's opening line is imperative: 'Don't ask Uncle Pat why the night sky is dark.' We are then given all the reasons why this would be inadvisable, including the above sheep drench, each of which are drawn from scenarios of Uncle Pat's life. In 'hot weather' he likes to drag his mattress out 'inside his dog-proof fence to sleep,' and 'Pat's golden wall was his orange tree' which, 'Like Uncle Pat…had never borne fruit.' In the poem, this particular metaphor is used to show how, after the speaker dumps fertilizer on the tree, Pat's view is then 'intersected at every point with oranges / twenty feet up in the sky.' When the speaker was not paid for his manure, the oranges did not return, but Uncle Pat 'didn't miss them,' which helps to demonstrate Pat's outlook on life. This placement of the poem within the very specific and personal experiences of an individual existence, even if it is not the speaker's, allows for an immediate connection to the reader on a human level. Even if Uncle Pat's mannerisms are odd or quirky (and they are odd), his idiosyncrasies and habits make him all the more human, and exemplify the difficulties we have as

[297] Lehmann, G. (2008). 'The Golden Wall'. *In*: Riordan, M. and Bell Burnell, J. *Dark Matter: Poems of Space*. London: Calouste Gulbenkian Foundation. p. 93-95.

humans reconciling what may be seen as fact or logical theory with what is meaningful to us experientially.

After the initial lengthy, single-column stanza, which gives us the principal narrative of Uncle Pat, Lehmann shifts to the provision of further facts on Olber's Paradox, but with the same unassuming tone he's used to explain Uncle Pat, and only in six brief lines. This passage in the poem is an effective example of how poems employing science avoid veering out of poetry and into the 'information dump,' as there is both just sufficiently enough fact and a good stylistic choice to break up the heft of the first part of the poem. The choice of words to describe 'Olber's riddle' are predominantly one or two syllable words, simplified language, and uncomplicated expalnations: 'Gas and dust head up and glow,' 'Every square inch has its galaxies.' By retaining a register of language akin to everyday experience, as the rest of the poem imparts, there is no massive, self-conscious shift, and the poem remains a coherent whole.

The focus of this poem is the human narrative, the experience of an individual, which provides the imagery and the metaphor needed to communicate the idea poetically. Lehman transitions cleverly to the brain cells that have their hand in creating our everyday experiences. The stanza opens with another imperative, but instead a positive command, to 'Ask the cells inside your head / the same riddle, / why they don't all blaze at once / a golden wall of noise.' This shift from the astronomical riddle to the pathway the riddle must follow in our minds is significant. There is even a bit of the synesthete in Lehman's characterisation of the mind, with 'each neuron singing its own note / deafening your mind with light.' Lehman then touches briefly on religion, saying that this golden wall of the mind is what 'religious

visionaries / promise us,' 'every cell singing in unison, / a mass of indistinguishable stars.'

But 'something in the universe,' which is the uncle, 'denies / the golden wall.' There is a sense of the universe manifesting in certain structures, a sense of something beyond random order, suggested in the poem. The very thing in the universe that denies this golden wall is said by Lehman to be 'some structure which became Uncle Pat.' And Lehman's brief reference to the religious visionaries just previously does not go unrecalled, as when Pat goes outside on these nights, he leaves his wife 'Auntie Bridge inside / with pictures of saints on the bedroom wall.' This image from the household aligns with Pat's rejection of both the astronomical golden wall as well as the neurological golden wall. 'He takes his bedding / and lies in the darkness / where each star can broadcast as a soloist.' He wants not the shimmering overload of religious visionaries or of scientific theory. He wants solitude and simplicity, and will go to fair lengths to achieve both.

The final stanza of the poem sees Lehman closing out with a statement that neatly cinches the poem's concepts and imagery together, linking them as well to language. Drawing the final comparison between the preferred night sky of Uncle Pat and the Olber's paradox of the mind, we are informed that 'the night sky of the mind / allows a single file of thoughts / to light up as a sentence.' Given that we process much of our experiences through language, and in the case of this thesis, through the opportunities of poetry, this is a satisfying close to Uncle Pat's narrative.

Similarly, in terms of the focus being a brief personal narrative, Louis Simpson's (1986) 'Physical Universe'[298] provides a the third person account of a

[298] Simpson, L. (1986). 'The Golden Wall'. *In*: Riordan, M. and Bell Burnell, J. Eds. (2008) *Dark Matter: Poems of Space*. London: Calouste Gulbenkian Foundation. p. 56-58.

man's inability to sleep in the middle of the night, and his thoughts considering his son's homework left on the kitchen table, following various existential and cosmological concerns brought about. Initially, the first two stanzas present the scene and scenario, opening the narrative. Quoted material from the science homework, which makes up the next two stanzas, clearly describing the beginning stages of our galaxy's formation ('There was a local eddy in the swirling gas / of the primordial galaxy'[299]), is interrupted with an italicised couplet that is a direct quote from the first chapter of Genesis, what is considered the creation story in Western Christian belief. The poet does this to draw the parallel between the descriptions, one from science and one from a religious text, which do have their similarities. The cosmological story is returned to after this couplet, bringing us planets, continents, and then a quick tumble forth through the history of human life ('history, civilization, / the discovery of America') to the current date of the very early morning the poem's events are taking place.

We're brought from these very large and cosmic concerns right down to the most rudimentary and domestic: 'Tuesday, the day they pick up the garbage!' This jump is so very accurate to the contents of a human mind in daily experience, even when we are momentarily occupied in higher order considerations of being. Simpson then gives us a very detailed and practical account of this fellow taking out the garbage: he 'took the bag out of its container, / tied it with a twist of wire'; 'the large garbage-can / …was three-quarters full.' As the poem goes on, we are taken more and more into third person limited point of view, given his thoughts, even the name of his wife, Susan, who asks him in her sleep, '"Did you take out the garbage?"' when he

[299] Simpson, L. (1986; 2000). 'Physical Universe'. *In*: Riordan, M. and Turney, J. *A Quark for Mister Mark: 101 Poems About Science*. London: Faber and Faber. p. 13-15.

returns to bed. Though he answers her in the affirmative, she 'turned around to face him, / with her eyes still closed' and he thinks that 'perhaps she's an oracle, / speaking from the Collective Unconscious.' What he chooses to ask her is a telling reflection on the juxtaposition from earlier in the poem, between the textbook narrative of life's origins and that of Genesis: 'Do you agree with Darwin / that people and monkeys have a common ancestor? / Or should we stick to the Bible?' She asks again from her sleep whether he's taken out the trash, in response. When he considers this, he feels 'Her answer / had something in it of the sublime. / […] the kind of irrelevance / a Zen master says to the disciple / who is asking riddles of the universe.' And, much like Goldbarth's main figure in 'The History of Buttons,' the man seeks the gentleness of touch in the living surface of her form, where the poem closes with her continuing to breathe in her sleeping. No matter what we know, or don't know, we often return to the simplicity of a single moment of existence.

These poems have that subtlety and clarity that Hirshfield speaks of, including just enough of what is necessary for factuality and accuracy, but allowing the narrative, imagery, and metaphor within them to present the permeability and openness that is also essential. There is tenderness in the way that both main characters in the poems are regarded, their humanity and irrationality presented as is, neither approved or condemned, and the ultimate conclusions are left in the reader's hands. This is another aspect of poetry that allows for permeability, as David Swanger points out in the preface of *The Poem as Process*: 'poetry as an art is not something that generates the 'right' answers, because it is not a form of discourse that makes assertions,' but instead 'evokes rather than asserts.'[300] By evoking the experiences in these narratives, which take place between science and what contradicts or affirms it,

[300] Swanger, D. (1974) *The Poem as Process*. New York: Harcourt Brace Jovanovich. p. ix.

the poems give us that soft, gentle 'yes' of comprehension—we understand, and we feel a frisson of recognition.

Alison Hawthorne Deming's poem 'Mt Lemmon, Steward Observatory, 1990' (1994) is a five page poem detailing the experience of being at the titular laboratory as a visitor alongside the scientists who work in that dedicated space of astronomical study. She takes us along on this tour, showing us the stars like diamonds, the view through a telescope that reveals one tiny point of light 'become a city of stars'; another view shows us 'a cloudy nursery spawning / galactic stuff.' Through these visions, we gain a sense of awe alongside her. Deming considers the neuroscientific implications of what she sees, and asks:

> What is it to see?
> A mechanism wired in the brain
> that leads to wonder. What is it
> to wonder but to say
> what we've seen and, having said it,
> need to see farther.[301]

Deming expresses here the seeker's response, the shared aspiration to find the truth, the response to awe and wonder that has long been tied to both the scientific impulse and the spiritual impulse. *Scire*, to know. Through naming and describing, the measure of words we are given as scientists and poets, a pathway is made towards communication with another. Deming details the naming of galaxies, nebulas, and constellations, suggesting for one object to 'call it the Baseball Diamond, a story / we can see, one we can use / to find our way back.' The chosen names that are given to these astronomical objects used to convey them to the visitor, the layman, the common observer are those that can be recognised and related to by the ratio of meaning, their reference to human experiences.

[301] Deming, A.H. (2008). 'Mt Lemmon, Steward Observatory, 1990'. *In*: Riordan, M. and Bell Burnell, J. *Dark Matter: Poems of Space*. London: Calouste Gulbenkian Foundation. p. 88-92.

Deming contrasts these to the experience of the astronomers in the observatory, who 'can say *NGC5194/5* to another / and the other says *Ahhh*, / picturing the massive whirlpool.' The language we recognise and understand plays a large role in what we can grasp, and this is why science must often be communicated in language of imagery, metaphor, analogy, and narrative: 'a story / we can see.' In order to comprehend that which is out of our general realm of comprehension, we must be given metaphor, we must be carried over—and these stories we can see, in the form of naming, are just that. As Deming notes in the poem, 'Describing *is* imagining -- / knowing, not knowing but / having the language / to convey, to be the water carrier.'

Where the poem travels next is to the contrast between what we know by science and fact, and what we know by seeing and by experiencing. This is the difference between the sky being blue to us each day ('I saw it with my own eyes') and what makes this experience an illusion. Deming explores how the way we see the world around us, the sky above us, is more real to use than the theories we may be told, even though we may know their factuality. Yet,

> We still don't know what light is.
> Where matter comes from. How the dust
> became fire. Why our fire must
> turn to dust. All we have to go on
> (refining the instrument) is ourselves—
> the skin at the tips of our fingers.

Bryan Walpert includes Deming in his study of contemporary American poets in which he looks at evidence that certain poets known for their engagement with science are, within their poems, resistant to science.[302] Passages such as the one above, as well as Deming's well-known poem 'The Woman Painting Crates', are

[302] Walpert, B. (2011). *Resistance to Science in Contemporary American Poetry*. New York: Rutledge. Index.

view by Walpert as rejecting physics 'in favour of her common perception of her surroundings' (Walpert, 2011, in Middleton, 2015, p. 21). However, Middleton argues against this judgment, proposing that,

> Deming herself might be better described not as resistant to science but as disputatious, in a scientific sense, because she is concerned to counter the assumption that one specific science can explain everything. Science is nothing if not intense argument, as Deming knows.[303]

Disputing blanket authority is not declaring science to be the enemy, or even that what it has to tell us is wrong, but simply acknowledging that when it comes to our reality, what constitutes our experience is what we live by. The following two lengthy stanzas in Deming's poem convey two examples of this contradiction, which have to do with the way we experience both shooting stars and the moon. Deming compares the scientists in the observatory, who make earnest notes next to 'shapeless smudges' that must be taken seriously even if they turn out to be nothing, to 'poets as much as / the visitor who says, / *Ohhh, a shooting star*, / after she's been told / nothing is burning, nothing shooting.' Though what the poet sees are 'merely molecules of sky jumping / as dust from beyond whizzes by,' to the poet they are shooting stars, and though to the poet the smudge is a shapeless blot, to the scientist within his realm of knowledge and experience, that smudge could tell the story of a galaxy.

What Deming says is correct: both parties are just trying to capture what they see, and 'invent / a way to pass it on.' In the considering of the moon in the following stanza, Deming reveals to us how what was previously 'known' to science through observation lead to misinterpretations, evident in how the deep craters on the moon were named: 'Sea of Rains, Ocean of Storms' – what Deming calls 'a map of our misunderstanding.' Though science knows *now* that there is no water on the moon, 'the wonder is we can still see / the way it pours liquid pearl / over the earth's dark

[303] Middleton, p. 22.

waters.' The poet captures what she sees in this beautiful image. This does not discredit the moon's 'implacable dust…[that] smelled like cap guns.'

This is not a rejection of science. It is recognition that science's story is not the whole story, and neither can it be. Engagement with science should not have to mean complete and tacit agreement and lack of questioning. That would seem to edge uncomfortably close to unquestioning belief. The poem closes with the observatory's 'white domes humming on the mountain top' that won't address many of the more human problems directly surrounding them geographically, and they 'won't fix history or touch the places / inside we can't get close to.' So despite all of their powers to find more of the story of what is 'out there,' there are areas of the world, the universe, and ourselves that are beyond their jurisdiction. The qualities of a moonlit night's pearl cascade over the water to a poet, even the qualia of one poet's experience of pain or loss over another, are just as real as that arid moon. Understanding the difference between them and the difference of their purposes should be available to most readers via basic intelligence.

Gorrell reminds us that 'writing a poem is not just to inform or provoke thinking, but to evoke the deepest emotions,'[304] which involves engagement with the mystery. She quotes poet John Burnside (2006), who maintains that 'while science seeks at its best to reduce our ignorance, it cannot—and should not seek to—eliminate mystery. The more we know, the more the mystery deepens.'[305]

One pathway 'science poetry', as Gorrell calls it, can engage with the mystery is through what Gorrell also calls transformative seeing. This level of seeing is partly metaphoric, as it involves 'looking at one thing and seeing another.'[306] Seeing in this

[304] Gorrell & Colfax, p. 16.
[305] Ibid, p. 16.
[306] Ibid, p. 57.

way goes beyond looking of observation and record, as seeing in this way 'inspires, raises questions, and arouses curiosity, entering the realm of the spiritual and mystical.' Yet, as Gorrell elaborates, this sort of seeing, active in science poetry, goes beyond either solving puzzles or 'inspiring feelings of awe and spirituality.' Instead, this 'kind of seeing involves deeply personal connections and insights which ultimately transform the viewer' and allow her 'to see the world and the world of self with new eyes.'[307] Transformative seeing must involve the human experience, the connection between the experiencing mind and the larger cosmos, translated in Blaser's sense to correspond with larger and larger elements. It must be spiritual, metaphorical, subtle, clear, and carry us across.

The poetic imagination has been turned towards and harnessed for its possibilities by many science communicators, including Frank and Sagan, both of whom include quotes and passages from poems in order to demonstrate their points and ideas, in *The Constant Fire* and *The Varieties of Scientific Experience*. But an unexpected scientist has reached for poetry as one place he would recognise the sacred, albeit with an emphasis on the secular sense—Richard Dawkins, evolutionary biologist and well-recognised science writer, also known as one of the Four Horsemen of the New Atheism, along with Daniel Dennett. Dawkins considers what is sacred for the scientist in a brief essay aptly titled 'The Sacred and the Scientist,' the penultimate essay in *Is Nothing Sacred?* (2004), which collects the views of a number of philosophers and humanist thinkers on the subject.

Dawkins opens with the acknowledgement that he has felt 'a sense of the sacred,' and can cite 'other humanist scientists' who have also felt the same. Dawkins explains that this feeling of 'holiness' is similar to the feeling that brings you close to

[307] Gorrell & Colfax, p. 59.

tears at the sight of the Grand Canyon or images from the Hubble Telescope. He compares these to 'being moved to tears by music, by a Schubert quartet, say, or by poetry. The human mind is big enough, and imaginative enough, to be poetically moved'[308] by these sensations, these sights, the significance of them. He draws the comparison between poetic imagination and 'awe', 'why you feel as though you are undergoing a religious experience.' Though Dawkins asserts that in spite of not being able to explain this feeling yet, one day he believes science will, but 'it will in no way demean it.' Still, it is significant, here, to find what Frank would class as scientific hierophany, and Hagerty term spiritual experience, named as the poetic imagination by Dawkins. I believe this affirms that much more how poetry is indeed the appropriate venue to position this necessary dialogue.

Barabara Brown Taylor addresses an important distinction between two terms connected with spirituality and its extended associations. She notes that:

> some religious thinkers make a distinction between belief, defined as intellectual assent to a particular set of theological convictions, and faith, defined as 'an unreserved opening of the mind to the truth, whatever it may turn out to be.'[309]

In this sense, faith could be applied to science or spirituality, beyond religion as the framework Taylor is referencing, further to any seeking of knowledge. Whether science or spirituality, Taylor also reminds us, 'our beliefs are always challenged by our experience, which begs us never to put the lid on truth.'[310] This is why experience, seated in uncertainty yet also in clarity, is so important. It allows for us to leave the lid off, keep our perspectives from being sealed away from new

[308] Dawkins, R. (2004). 'The Sacred and the Scientist'. *In*: Rogers, B. ed. *Is Nothing Sacred?* Abingdon, Oxfordshire: Routledge. p. 135-137.
[309] Taylor, p. 62.
[310] Ibid, p. 62.

illumination, from becoming that calcified imagery of religious dogma mentioned by Lee: 'a radical openness to truth, whatever it may turn out to be.'[311]

Pattiann Rogers' argument offers a way forward which builds up no walls between the ideas of spirituality and science, but instead opens up the dialogue further, bringing more opportunity for illuminations that shine into our experiences from multiple sources. She calls poets and spiritual individuals alike to embrace science, by:

> assimilating it, incorporating its glory, celebrating both its findings and its method of scrutiny and openness, using its great power and stimulation and beauty as a jumping-off point to an energetic and meaningful spirituality.[312]

What this can bring to the poem is that permeability that will not only open new viewpoints of our experience to further meaning, but also encompass the possibilities for structure and precision that science provides by its very nature. Perhaps in this way a good poem can, itself, operate as that energetic and meaningful spirituality that Rogers proffers, by, as Hirshfield suggests, 'being one part answer, one part question, and one part thrown open window.'[313]

[311] Ibid, p. 63.
[312] Rogers (2001a), p. 12.
[313] Hirshfield (2008), p. 33.

## Part III
## The Braid and The Stones

I knock on the stone's door.
—It's me, let me in.
I want to come inside,
look all around; breathe you in.

–Wislawa Szymborska, 'Conversation with a Stone'[314]

### VOICE & DIALOGUE

T.S. Eliot (1955) establishes three distinct 'voices' found in poetry[315] in his published lecture on the subject, differentiating them depending on the intended individual the poet is speaking to within a poem. The first is 'the voice of the poet talking to himself—or to nobody,' whilst the second, a broad category, is the 'poet addressing an audience, whether large or small' including both the love poem and the epic narrative, and the third has the particular purpose of theatre, essentially, and is 'is the voice of the poet when he attempts to create a dramatic character speaking in verse.'[316]

The poems within *Twelve Foundation Stones* can be classified, in Eliot's terms, under a combination of the first and second poetic voice, varying in their primary employment of one over the other. These poems include a variety of address, fluctuating between first person report, the second person address of a 'you', the use of inclusive of first person collective pronouns such as 'we' and 'our', and more straightforward third person reportage, often linked with narrative, though not always.

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[314] Szymborska, W. (2001) 'Conversation with a Stone.' (poem) *The Kenyon Review*. New Series, Vol. 23, No. 2, Cultures of Creativity Centennial Celebration of the Nobel Prizes (Spring, 2001). p. 90-93.
[315] Eliot, T.S. (1955) *The Three Voices of Poetry*. 2nd ed. London: Cambridge University Press.
[316] Eliot, p. 4.

These different addresses and points of view within the poem help distinguish the voice used to a certain degree. There are, in some poems, such as 'Olivine'[317] and 'The Constellation's Prayer'[318], a voice that is not my own, but intended to be an 'assumed voice,' that of imagined address.

Eliot asserts that though he, for clarity, begins by discussing the different voices as mutually exclusive, in fact he views them as most often found together in some combination, even within a single poem, and specifically in non-dramatic poetry (of which *Twelve Foundation Stones* is primarily composed of) the first and second voice exist most often together. [319] For the aims of this research, primarily that of the dialogic possibilities of poetry, this multifaceted and integrated voice has the purpose and benefit of blending perspectives.

### ADDRESS OF THE 'YOU,' OR 'THOU'

The second voice of poetry often corresponds with the second person address, due to its nature of directly addressing or including an audience or reader, whether directly or by implication. This second person address naturally coincides with notions of dialogue, as there is this implication of an 'other' being spoken to by the voice in the poem, which be the poet him or herself, or may be an assumed voice.

In Lyon's discussion of Celan, he tallies up the various instances of the address of a *Du*, or 'Thou', what he perceives as a feature that is an 'obvious attempt to structure the poem as a dialogue between the speaker and this unidentified Thou.'[320] However, this 'unidentified Thou' is often not in reality always

[317] Barnes, M. (2017) *Twelve Foundation Stones of the New Heaven: A Collection of Poems*. Unpublished PhD. Bath Spa University. p. 1.
[318] Barnes, p. 36.
[319] Eliot, p. 19.
[320] Lyon, p. 114.

unidentified, and Lyon looks at the various specific individuals, including God[321] and the dead[322], but also 'literally dozens' of 'seemingly disparate objects, persons, and even abstractions [or words] taken from almost every realm of human experience.'[323] Lyon makes the case that this address of a 'Thou' recurrent in Celan's poetry is essentially dialogic, and what separates the poems 'from lyric monologue,'[324] which he observes is the dominant mode of most recent German verse.[325]

In *Twelve Foundation Stones* there are a number of different poems that address various 'yous' within them, some of these addressing specific individuals, such as a lover or beloved, additionally that of family members such as mother or father, and in others a more general 'you' or sought 'thou', with still others, as with Celan, addressing objects or concepts, such as the 'muon' in 'The Toe of God'[326]. There is a distinct balance evident in the three sections that focuses largely around this address of a particular 'you', especially within the first section: more than half of the poems under the section (seven of the thirteen) are addressed to a 'beloved' you, two are addressed to a 'thou' or more general 'you', one is addressed to a concept (the muon), and one is addressed to a 'you' by an assumed voice, leaving only two focused otherwise, one being a first person report and the final being the longer third person poem, incorporating narrative components, 'Out of Sight'[327].

The balance shifts the other direction within the second section, wherein the majority of the poems are spoken from the first person point of view of an 'I', some being narrative in focus yet mostly lyric, in the sense of, per Eliot's consultation of

[321] Lyon, p. 118.
[322] Ibid., p. 115.
[323] Ibid., p. 115.
[324] Ibid., p. 116.
[325] Ibid., p. 115.
[326] Barnes, p. 5.
[327] Ibid., p. 7-11.

the Oxford English Dictionary, '"directly expressing the poet's own thoughts and feelings", not in the quite unrelated sense of a short poem intended to be set to music,'[328] which Eliot emphasises is relevant to his 'first voice' of the poet speaking to himself or to no one. However, Eliot does remind us that even when considering the first voice, where a poet has written for himself, he 'will want to know what it will have to say to other people.'[329] These poems often focus on a central image or several images for the revelation of internal thought, and many of these images are drawn from or related to science—these are discussed more thoroughly in the section on 'Image as Axiom.' There are, nevertheless, a couple of poems addressing a 'you' in this section, and several which include within the first person perspective a collective 'we' or 'our', which in turn implies a you.

The primary focal point of the first section is, as mentioned, a lover or a beloved. The intended 'you' in these poems is my long-time partner and now husband, and a good many of them directly concern personal experiences shared with him ('Blue Dot Aubade', 'The Colour of our Galaxy', 'Equations for a Falling Body') though others, explore the nature of the love relationship via scientific metaphor, such as in 'Cheating Light'[330], considering the possibilities of remaining connected after death via physics, and 'Universe Love Poem'[331], which considers proximity after separation and the forces that create physicality. These love poems are addressed to this particular 'you' with the intention of communicating the feelings expressed, but, as Eliot affirms, 'a good love poem, though it may be addressed to one person, is always meant to be overhead by other people.'[332]

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[328] Eliot, p. 16.
[329] Ibid., p. 19.
[330] Barnes, p. 12-13.
[331] Ibid., p. 16.
[332] Eliot, p. 6.

‘Olivine’ the first poem of the collection, and ‘The Constellation’s Prayer,’ the last poem in the second section of collection, prior to the series concluding the book, both have in common the assumed voice, the voice not of the poet but of a different real or imagined figure. These are the only two in the collection that do this, and they have an additional tonal and thematic similarity. The voice in ‘Olivine’, though not initially conceived of at the time of writing it, is that of a loving address of a creating force, somewhat godlike, to an aspect of the created universe. Upon reflection, it became evident that this was a feminine creator, maternal in nature, with the subtext of myself as the imagined ‘you’ to a degree, within the poem. This had to do with my eye colour, being an olive green, which is reflected in the ending couplet: ‘You are the greenest twinkle / in my eye, Olivine.’

However, on a much larger scale and linking more with the science of the poem, it addresses both the actual mineral magnesium iron silicate, which I originally discovered in the process of researching the meteorite that exploded over Russia in 2013[333], which contained olivine. The thread of the this mineral’s existence, the fact that it was found both terrestrially and in debris from the early Solar System and around distant stars, spoke to the overall interconnectedness of matter, something with which astronomy and cosmology both inform my personal spirituality. Olivine is also the gemstone peridot, which links the poem to the series at the end of the collection, as well as several other poems throughout, including ‘Singularity’s Sum.’[334]

Astronomy informs ‘The Constellation’s Prayer’ also, and as a poem set up with an assumed voice, this poem more directly embodies that of my own mother, re-

[333] Amos, H. (2013) ‘Russian meteorite: hunt for debris begins, but was it a comet?’ *The Guardian*. 18 Feb. Available online: https://www.theguardian.com/science/2013/feb/18/hunt-russian-meteorite-fragments-comet (Last accessed: 3 Jan 2017)
[334] Barnes, p. 4.

envisioned as the identified constellation. Both my own name and the name of my mother, Norma, are names of astronomical bodies. Norma is a constellation in the southern sky between Scorpio and Centaurus named by French astronomer Nicolas Louis de Lecaille in the mid-18th century, directly during the Age of Enlightenment. The constellation contains four stars, set in a near-square arrangement, and Lacaille originally named the constellation for a draughtsman's set square and ruler.[335] Lacaille had also charted over a dozen other new constellations in the Southern Celestial Hemisphere during his stay in South Africa, all but one of which honoured instruments of measurement that honoured the Age of Enlightenment.[336] Various other facts about the constellation, such as its blue supergiant star and the position in proximity to the Milky Way, which the constellation passes through when viewed from Earth, became worked into to the poem's symbolism.

My own name, Miranda, is shared with a moon local to the Solar System around the planet Uranus, named for the character in Shakespeare's *The Tempest*. The moon is distinct because of its battered and misshapen form, which has generated many theories about how this originated.[337] Miranda's known characteristics of extreme seasons, uneven and jagged topography, and unusually sharp angle of orbit, came to symbolise my own erratic nature observed by my mother throughout my life, and the tenderness towards these recognitions is in the expressed hope that 'you will circle / a planet / fit to view your light'. The final lines of the poem's 'prayer' are in

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[335] 'Norma Constellation.' Constellation Guide. Constellations: A Guide to the Night Sky. Available online: http://www.constellation-guide.com/constellation-list/norma-constellation/ Last accessed: 03 Jan 2017.

[336] Wagman, M. (2003). *Lost Stars: Lost, Missing and Troublesome Stars from the Catalogues of Johannes Bayer, Nicholas Louis de Lacaille, John Flamsteed, and Sundry Others*. Blacksburg, Virginia: The McDonald & Woodward Publishing Company. p. 6-7.

[337] Choi, C.Q. (2014) 'Bizarre Shape of Uranus' "Frankenstein" Moon Explained.' *Space.com*. Available online: http://www.space.com/27334-uranus-frankenstein-moon-miranda.html (Last Accessed 3 Jan 2017)

fact not against the many welcome, impacting, and remarkable discoveries of the Enlightenment period, but instead the creation of an enemy in religious thought and the continued increase in the reductive scientistic impulse.

## VOICE OR VOICES?

Michael Wilson (2012) considers an overarching voice that 'is' poetry in his essay '"Last Least Voice of Her Voices": The Voice of Poetry,' which engages the compelling idea that

> …poetry-making is an direct engagement with a complex 'voice' which is both 'inner' in its emergent mystery and its inherent role in seeking a deeper self, but also 'outer' in that it invokes a super-cultural representation of all things.[338]

Wilson discusses some of the factors of the physical voice, such as how one can recognise a voice despite not being able to comprehend the words,[339] and though he acknowledges that voice is 'intrinsic to words', he claims also that poetry's utterance is 'something other than its words,'[340] and ties this to the suggestion that this poetic omni-voice 'may be something that is separate from the words it uses.'[341] This separation of poetry from its language hearkens back to Richards' argument of separating the words of poetry from that of its experience, which has already been established as flawed, and which brings us back around to the problem that poetry is not meaningless, non-referential gibberish.

Wilson prioritises the creative act against criticisms of the Romantic self, which asserts that this sort of universal self excludes history and otherness[342],

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[338] Wilson, M. '"Last Least Voice of Her Voices": The Voice of Poetry.' In: Norgate, S. *Ed*. (2012) *Poetry and Voice: A Book of Essays*. Newcastle upon Tyne: Cambridge Scholars Publishing, p. 223.
[339] Wilson, p. 224-225.
[340] Ibid., p. 226.
[341] Ibid., p. 231.
[342] Wilson, p. 227.

appealing to us to 'remain sensitive to the non-political and non-linguistic possibilities of poetry', as these allow the proposed 'super-cultural voice' to exist, as it is, 'at a remove from the harder facts of language-use.' [343] This is problematic both because of its removal from the scaffolding, or bones, of language that may be valuable to the poetry of dialogue of interest to this thesis, but also because of its removal of the unique components of individual subjective experience.

Wilson objects that 'Poetry is more than choice utterances. The creation is not simply a re-appropriation of language that we have heard, '[344] and he expresses the view that twentieth-century concepts such as Bakhtin's *dialogism* and *heteroglossia* would paint language as 'mistrusted' and 'anything but personal.'[345] Bakhtin's theories indeed suggest that 'all our utterances (including our creative works), [are] filled with others' words, varying degrees of otherness or varying degrees of "our-own-ness"'[346] , and they are also inseparable from culture, community, location and history. The word, or utterance, is 'heteroglot from top to bottom'[347], and language is not inherently neutral and private.[348] Bakhtin also asserts that:

> …our thought itself – philosophical, scientific, artistic – is born and shaped in the process of interaction and struggle with other's thought, and this cannot but be reflected in the forms that verbally express our thought as well.[349]

One might propose that Wilson's objection seems rooted also in the socially atomistic notions stemming from dualism, those of Descartes' diamonds, the other 'stuff' of spiritual substance, isolating the language of the poet's consciousness from

[343] Ibid., p. 231.
[344] Ibid., p. 231.
[345] Ibid., p. 225-226.
[346] Bakhtin, M. (1986) *Speech Genres and Other Late Essays*. Trans. McGee, V.W. Austin, Texas: University of Texas Press. p. 89.
[347] Bakhtin, M. (1992) *The Dialogic Imagination: Four Essays.* Austin, Texas: University of Texas Press.
[348] Bakhtin (1992), p. 294.
[349] Bakhtin (1986), p. 92.

the consciousness of others. This would separate poetic language from the 'rich, well-organised language' we use culturally to describe experience to one another, the 'indispensible working skeleton of our thought' and the larger skeleton of agreed upon definitions. This does not benefit poetic language anymore than it benefits science's glossary, which is what Midgley points to here. Wilson seems as if he wants to isolate the poetic consciousness as something timeless and special, and disconnected. It would also appear that Wilson would prefer to disregard the innate development of language as a shared system.

Bakhtin's theories are valuable, however, for several reasons. For language, as Bakhtin conceives it, is actually not so far removed from Wilson's complex omni-voice, but it is a living thing of 'the individual consciousness,' which 'lies on the borderline between oneself and the other.'[350] The heteroglot capabilities of language are what allow it to transverse this borderline, similarly to Goldbarth's spirituality of the text. Secondly, as utterance that anticipates response,

> Dialogic expression is unfinalizable, always incomplete, and productive of further chains of responses: meaning is never closed and always oriented toward the future.[351]

This character of dialogic expression is because 'the word in living conversation is directly…oriented toward a future answer-word'[352]. Ultimately this creates a dynamic in which 'past meanings,' or those already established by previous contexts, can, in 'certain moments of the dialogue's subsequent development,' be 'invigorated in renewed form (in a new context).'[353]

Bakhtin's ideas would indicate that language's interactive orientation towards future communication, and the subsequent permeable possibilities of new contextual

[350] Bakhtin (1992), p. 294.
[351] Ibid., p. 170.
[352] Ibid., p. 279-280.
[353] Bakhtin (1992), p. 170.

meaning, allow for dialogic capabilities of language to be a distinct part of spirituality. By the inclusion of scientific language within this continuum, particularly within poetry, the opportunity arises for scientific ideas to be included, renewed, and invigorated by a spiritual context.

Wilson maintains that 'poetic creation' is 'Fathoming words from non-linguistic, ineffable knowledge.'[354] Perhaps the ineffable impulse to find words exists within that which Eliot mentions as part of the first voice of poetry, Gottfried Benn's 'creative germ'[355] or 'dark psychic materials'[356] that belong to the soul, and as the soul emerges to meet language, dialogue is then made possible. This meeting point is, after all, where Bakhtin's individual consciousness exists. And perhaps the individual, unique facet we contribute to the overall diamond of entire reality that is the subjective perspective's value, as a component of the whole—another window into the aquarium.[357]

However, what is useful of Wilson's argument is the idea of a poetic voice linked to the emergence of self through dialogue. The self, a more individual self unique to the poet seeking expression, 'emerges in an act of writing'[358], and this 'poetic self as voice is one which desires communication'[359]—it 'reaches out to the other that will validate it and, in an ontological sense, will forge its being.' This recalls to mind the isolated self in Buber and Celan, and its discovery of the self made possible through the encounter, through dialogue. Whether the poetic voice employs

[354] Wilson, p. 226.
[355] Eliot, p. 17.
[356] Ibid., p. 21.
[357] Midgley, p. 247.
[358] Wilson, p. 228.
[359] Ibid., p. 229.

the 'speaking "I"' or not, this dialogue is an inherent part, as there is 'process of definition that requires an audience'[360] (emphases the author's).

Despite Wilson's seeming eventual (and contradictory, given his objections to Bakhtin) erasure of this self, describing poetry as 'transcend[ing] all identity'[361]), Wilson's recognition of the dichotomous nature of poetry, which

> …regularly deals with tensions that arise from paradox: juggling multiple meanings of words, toying with multiple interpretations and dancing across multiple personas[362],

is fundamentally what allows for the scope of poetic voice: that a poet using many voices, or wearing many masks, may still be at once recognisable. In this sense, Wilson's claims for 'individual voice' being the voice of 'all poetry'[363] are far too vast. One might ask, couldn't the voice of many voices, or amongst many voices, be a choir?

This is precisely what David Swann (2012) entertains in his process of discovering the way a collection of 'many disparate pieces' finds 'its own holistic "voice."'[364] His collection, *The Privelege of Rain: Time among the Sherwood Outlaws*, incorporates poems and prose-pieces, as well as varying subject matter within the poems. Though at various places in the essay Swann seems to conflate voice and theme, he discusses the geographical location of the prison where he worked, which is the source material for his collection, and the impact of examining voice and collection order in Tim Liardet's *The Blood Choir*, also written from experiences with the prison environment. These lead him to what he calls the 'guiding

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[360] Wilson, p. 229.
[361] Ibid., p. 230.
[362] Ibid., p. 231.
[363] Ibid., p. 230.
[364] Swann, D. 'A Choir of Trees: Discovering the "Voice" of a Poetry Collection.' In: Norgate, S. *Ed*. (2012) *Poetry and Voice: A Book of Essays*. Newcastle upon Tyne: Cambridge Scholars Publishing, p. 235.

metaphors of "forests" and "choirs"'[365] that were useful to his finding the voice of his collection.

A sizeable portion of the essay examines stylistic elements in Liardet's collection, a number of which are not applicable to the current purposes; however, Liardet's 'achievement of both coherence and variety,' avoidance of 'repetition of formal qualities'[366], and the way in which the 'voices of the "choir" are mediated by Liardet, or by a persona that represents him'[367] were all of value in considering how the different poetic voices worked to together in my collection. Swann also shares guiding advice he received in terms of ordering a collection from poet Mimi Khalvati, who advised Swann to pay attention to the 'tension between matter and form', but also assure that the whole revealed a 'recognisable identity'[368].

Swann comes to the realisation that, 'A true book is a forest or a choir, all the parts working together and against each other in ways that create an overall "voice"'[369]. This idea of a 'choir' of voices, drawn together from individual poems, which make up a single recognisable vocal identity, is a guiding notion in the organisation of *Twelve Foundation Stones*.

## SPLITTING THE STONES: SECTIONING

The final section of the collection, the 'Twelve Foundation Stones' series of prose poems from which the collection's title is drawn, is an amalgam of the various voices, which were otherwise concentrated more distinctly in the first two sections. Whilst the first section was primarily 'thou'-directed, and the second more focused on the first person, the third has an evenly split balance. Six of the twelve 'foundation

[365] Swann, p. 235.
[366] Ibid., p. 237.
[367] Ibid., p. 238.
[368] Ibid., p. 237.
[369] Ibid., p. 241.

stones,' or prose-poems, are directed towards some discernable 'you', though these are split up between a beloved, a general 'you', and specific 'yous' in the form of my mother and father. The other six 'stones' are either first person, first person collective, or third person.

Originally the prose-poem series was placed as the second section dividing the first two; however, the weight of the collection was decided to be unbalanced and the grouping was therefore shifted to the end of the collection. After this shifting of balance, it was necessary to consider how the other two sections were to be organized, and whether their current division was satisfactory. Several other poems in the collection were also removed, which changed the dynamic somewhat of the remaining sections. However, the voice dynamic within the remaining sections, now sections one and two, made these sections distinct from each other, and several other elements discussed in further detail below also contributed to the choice to preserve the three-section division.

Though the choice to divide a poetry collection into sections is one that may presumably have effects that could sever harmony or speech between the poems, the sectioning of this collection has lead to a number of desirable antiphonic effects. The notion of the 'choir,' and the context of antiphon as either 'a versicle or sentence sung by one choice in response to another' or 'a composition…of verses or passages sung alternately by two choirs'[370], the sectioning within *Twelve Foundation Stones* has lead to the 'choirs' of each of the three revealing correspondence with the others. The choices of titles applied to these were intended to magnify these correspondences.

[370] 'antiphon.' n. *OED Online*. Oxford University Press, December 2016. Available online: http://www.oed.com/view/Entry/8760. (Last accessed 4 January 2017)

The first section of the collection, of three, is titled 'Ellipses', plural of ellipsis as well as ellipse. The multiple meanings of these terms are each of significance. The first is that of its astronomical application, and the importance of orbiting. An ellipse in the geometrical sense is the shape an orbit makes around its central focal body, in particular celestial bodies such as planets and moons. The poems in this section focus, largely, around a 'you', which is at the centre of the poem's orbiting. Poems such as 'Blue Dot Aubade'[371] and 'Equations for a Falling Body'[372] deal directly with scientific concepts of orbits and their physical outcomes, such as gravity.

The other meaning of the word is that of an omission, or something left out, marked in text a series of three dots. The notion of something missing ties into 'Out of Sight'[373], which addresses the notion of a missing plane full of passengers, a missing prophet (Elijah), and the search for the deep space neutrino. However, when an ellipses is used at the end of a sentence, it indicates, often, there is more to be said. The central theme of romantic love in these poems correlates to this, in that the relationship is ongoing, and there is always more to be said. The Ancient Greek etymology comes also from a word meaning 'falling short'[374], relevant to a similar notion that one cannot say enough to express love accurately. Additionally, as part of the overall theme of the collection and the aims of this research, the 'open space' of an ellipsis is significant in its openness to future possibility.

Section two is titled 'Eclipses.' There are several significances to this choice. One element is its position in the middle of the other two sections. The other is the

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[371] Barnes, p. 2.
[372] Ibid., p. 14.
[373] Ibid., p. 7-11
[374] 'ellipsis.' n. *American Heritage® Dictionary of the English Language, Fifth Edition*. (2011). Available online: http://www.thefreedictionary.com/ellipsis (Last accessed: 3 January 2017)

recurrence of the sun and moon within the poems of this section, which are often components of an eclipse. The earth, and consequently the human perspective, is necessarily in the middle position for a lunar eclipse, as it is the earth's shadow that blocks the sun's light reaching the moon. A solar eclipse is the moon blocking the sun, however, and this could feasibly account for the presence of other perspectives. There term syzygy, of which an eclipse is one type, is also used to indicated a pair of connecting things, so analogously the second section in the collection indicates a correspondence between the first and third sections.

The third section is titled 'Epiclesis.' An epliclesis is an invocation of the Holy Spirit within a Christian Church context, often a prayer or part of a prayer, which can be used to bless the Eucharistic elements or the communicants, or both.[375] In considering sacramental possibilities of language, detailed more within the discussion on metaphor, especially that of the creation of experience, this term felt meaningful to the series. The series, which is also discussed in further length within the passages on experiment, draws on material from the book of Revelation, experiences which in some way could be viewed as spiritual, Hubble Telescope imagery, precious gemstones, and astronomical science. This series also has the most diverse inclusion of voices within the collection, in terms of section. Throughout there is a further sense of calling upon a response than the other section of the collection.

Together these terms, ellipses, eclipses, and epiclesis, share a musical link between their sounds as extremely close yet partial rhymes, and the unexpected interaction of their meanings between them tie the book together. The characteristics of astronomical orbits are inseparable from bodies experiencing them, and these very bodies are what also experience an ecliptical arrangement. Together as a whole within

[375] 'epiclesis.' n. *OED Online*. Oxford University Press, December 2016. Available online: http://www.oed.com/view/Entry/63262 (Last accessed: 3 January 2017)

the collection is a desire to invoke the spiritual, to bring that presence into the poems, which is in turn culminated within the final series, titled 'epiclesis.'

## METAPHOR & METHODOLOGY

As with the 'majority of late twentieth century poems about science' that Middleton observes, which 'borrow scientific ideas and discoveries for metaphoric uses,'[376] so too do many of the poems within *Twelve Foundation Stones*. Whilst Middleton's primary interest in *Physics Envy* is how the methodologies of science are reflected in the methods of the poets he examines, the use of metaphor is still an essential engagement with science in poetry, and one that is especially relevant to the inclusion of spirituality significant to this thesis.

Sean Carroll, a cosmologist and physics professor at the California Institute of Technology who specialises in dark energy and general relativity, supports the intersection between science and creative literature. He discusses this in his article 'From Experience to Metaphor, by Way of Imagination' (2005) arranged from a conference talk more particularly on drama and narrative but ranging also to poetry. Carroll views science, 'an unapologetically reality-based activity' and 'something not directly accessible to our everyday experience,' as being 'fruitfully engaged by the work of the literary imagination: as source material for metaphors.' In this way, science is used to 'illuminate, or at least comment on, a directly human activity.'[377]

[376] Middleton, p. 18.
[377] Carroll, S. (2005) 'From Experience to Metaphor, by Way of Imagination.' California Institute of Technology. PDF Available: https://www.researchgate.net/publication/228844972_From_Experience_to_Metaphor_by_Way_of_Imagination

There is, of course, the issue of what actually constitutes reality and its perceived opposition to science, which Midgley[378] and Tiffany[379] both address; however, creative literature does indeed have a bountiful and valuable source for metaphor and analogy in the body of information that science provides from its discoveries. Carroll also concedes that whilst 'science itself is not purely a concoction of human intellect,'[380] as it is instead the meticulous engagement of that intellect with the information verified by observation and experiment, the theories and concepts that result from the 'empirical prodding'[381] of scientists, in their desire to understand the universe, are 'products of the human imagination' and 'ultimately human constructs, and as such lend themselves readily to metaphorical uses.'[382] The imagination, that middle way, is again where these perspectives meets, and this middle way is significant from the spiritual viewpoint as well.

Metaphor functions as a significant tool within a poetics of spirituality, contributing also to poetry's dialogic capacity the openness and permeability necessary to prevent finality and certainty, mentalities that eliminate possibility. David Brown (2008) sets out in *God & Mystery in Words: Experience through Metaphor and Drama*, 'an exploration of how language can sometimes be said to

[378] Midgley discusses how the Lockean distinction between primary and secondary qualities, that of science and perception, became easily interpreted as a divide between reality and illusion. (Midgley, p. 73)
[379] Tiffany, in his considerations of the atomising strategies employed by the defence counsel in the case of Rodney King's infamous beating, draws on Stanley Fish's criticisms to explain how the 'material body evoked by atomist doctrine is no less estranged from empirical reality than the unblemished and culpable black body produced by the defense counsel's analysis,' and ultimately reveal how definitions of reality produced by atomist materialism are themselves illusory, despite the persistent sceptics they endorse towards experiential appearances. (Tiffany, 167)
[380] Carroll, p. 4.
[381] Ibid., p. 5.
[382] Ibid., p. 5.

function sacramentally, in conveying experiences of divine presence.'[383] In doing so, Brown also examines the history of theology, which, interestingly, also suffered from an increased limitation[384] of words of their literal meanings,[385] and an overall focus on controlled interpretation, [386] particularly in terms of sacrament. Similarly to science, a need to pare down and simplify for the purpose of reaching an 'elegant' conclusion lead to isolation and elimination of other perspectives. Proposing that words, particularly metaphor, function sacramentally, Brown concedes, is far 'less physical or material than the usual sort of thing considered as candidate for such mediation.'[387] He maintains that the sacramental potential of words is both beyond and inclusive of their ability to describe experience, because they 'sometimes themselves' constitute experience.

Brown's discussion of metaphor is especially useful for us here, as he explains how metaphors work against limitation and finality in the way they inherently function within language. Whilst inquiry and seeking explanations are equally a part of theology, spirituality, and science, Brown reminds us that 'search for explanation need not prove reductive'[388] in any of these pathways. This is echoed by Midgley in her consideration of specific types of questions and their explanations being incomplete.[389] It is in fact metaphor's combination of ontological statement and open-endedness that gives it this dual ability: 'Metaphors do after all both affirm something to be the case and yet refuse complete identification and closure.'[390] Instead, they

[383] Brown, D. (2008) *God & Mystery in Words: Experience through Metaphor and Drama*. Oxford: Oxford University Press. p. 17.
[384] Brown, D., p. 49.
[385] Ibid., p. 18.
[386] Ibid., p. 39.
[387] Ibid,. p. 17.
[388] Ibid., p. 23.
[389] Midgley, p. 157.
[390] Brown, D. p. 23.

allow for a more entire, whole look at the nature of reality and experience through their ability to 'point allusively beyond themselves', and, though by nature 'incomplete'—or rather, inconclusive—'constitute any substantial or serious attempt to map reality.'[391]

This statement calls to mind Midgley's analogy of different components to knowledge and different explanations being various kinds of maps to our reality.[392] If one is to compare several sorts of maps, one involving political borders, one involving geological formations, and one involving airlines, they will not all make sense at once, nor will they all answer a single given question.[393] Certainly, though each view is incomplete, together they help form a wider, complete knowledge of a broader reality. Midgley uses this analogy to support her response to the reductivisim of 'fundamental' physical explanations of all reality. As she emphasises, 'complete explanations [are] not available.'[394] Instead, we have a 'set of partial and overlapping' explanations 'dealing with different aspects, which can be adequately ordered and related.' Midgley also uses the analogy of 'various, small windows unevenly distributed around' an 'enormous, ill-lit aquarium'[395], of which 'scientific' and 'historical' are just two among many of these windows. And since we never see this aquarium, like reality, in its entirety, we need the all windows to make a complete view. So metaphor, whilst allusive and elusive, is more complete and whole than a single isolated definition.

Brown's proposes that metaphor also possesses the ability to bring these different views, either map or window, together:

[391] Ibid., p. 44-45
[392] Midgley, 134.
[393] Ibid., p. 112.
[394] Ibid., p. 137.
[395] Ibid., p. 141.

> … wherever metaphor and symbol occur they help to draw apparently different aspects of reality closer to together and so help generate a more inclusive conception of the world that we inhabit, and so hint, however tentatively, at a single enfolding reality [that lies in God as their common creator].[396]

Though Brown's purposes are throughout the book focused theocentrically, what he says here of metaphor's power is intriguing. Given the divisions of ourselves and our reality that Midgley aims to overcome, and the possibility of poetry to be a part of a new unity, it would seem that metaphor's potential to draw different aspects of reality into a single enfolding whole is a powerful medium for a poet to use towards this end.

Canadian poet Alice Major points us towards the possibility of metaphor also contributing to visionary thinking that alters the mind, much like a spiritual experience or new discovery changes the way we think into the future:

> Perhaps the most profoundly important thing about metaphor is that it enables different narratives of the same events. An apt new metaphor can literally reconfigure the brain. New neural connections are made that will fire together for the rest of our lives.[397]

Major here is referring to psychological research outlined by Sam Glucksberg (2008, in Gibbs, 2008), where he considers 'How Metaphors Create Categories—Quickly.'[398] Major also conceives of how metaphors are like equations—that there is inherently an equal sign via the use of the verb 'is,' and this does not simply mean the two things compared are exactly the same, but is also 'a sign of action,' which means, like mass and energy are not the same in the famous $E=mc^2$, in a metaphor these

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[396] Brown, D. p. 20.
[397] Major, A. (2011) *Intersecting Sets: A Poet Looks at Science*. Edmonton, Alberta, Canada: The University of Alberta Press. p. 44.
[398] Glucksberg, S. 'How Metaphors Create Categories—Quickly.' In: Gibbs, Jr., R.W. *Ed*. (2008) *The Cambridge Handbook of Metaphor and Thought*. Cambridge: Cambridge University Press. p. 76-77.

items compared 'can be transformed into each other, that one mode of being can become another.'[399] And so metaphor can transform our ideas of a given reality.

A number of poems in *Twelve Foundation Stones* employ scientific metaphors in order to illuminate, or comment upon, per Carroll, my own human 'activities' or experiences, and also to explore potential characteristics of spiritual realities as I see them. Admittedly, I have, along with many poets that Middleton reviews, 'learned …science for the most part from popularizers, both scientists and laypersons, with the inevitable simplifications, distortions, and lacunae.'[400] My science background is largely self-education beyond the usual courses in pre-universities settings, though I was fortunate enough to have several science courses included in my liberal arts university education, despite the central major being Creative Writing, including Astronomy. However, in each poem where I brought in science elements, even where the initial information was sourced from popular science media, I did attempt to research the concept until I understood it as an external referent well enough to do it fair justice, and retain the 'bones' of the original meaning, before applying it to metaphor.

'Cheating Light' arose from one such encounter with a provocative concept: physicists reportedly breaking Newton's Third Law of Motion, 'by cheating.'[401] This immediately became the title for a poem, before the process involving understanding the 'trick with light'[402] that inspired the poem's central metaphor. I had to come to understand concepts such as negative mass, diametric drive, why matter can not have

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[399] Major, p. 35.
[400] Middleton, p. 11.
[401] Slezak, M. (2013) 'Light can break Newton's third law – by cheating.' *New Scientist*. 15 October. Available online: https://www.newscientist.com/article/dn24411-light-can-break-newtons-third-law--by-cheating/?full=true&print=true#.UmO1evmsiSo (First accessed 20 Oct 2013, Last accessed 04 Jan 2017)
[402] Barnes, p. 12.

negative mass, and why light can be used to create ‘effective mass’ by tricking photons backwards using the proper materials and pulses of the light. After a fair bit of research, these notions cohered.

The choice of couplets for the poem, with most lines enjambed to indicate continuation, seemed a natural choice given that it corresponded to both the ‘two intersecting loops’ of cable needed for the physicists’ trick, as well as to the lovers in the poem, the speaker and the intended beloved ‘you’ in the poem, with whom the speaker hopes to

> break the rules
> a little while we’re here:
>
> let our souls leak out into the dark
> and loop around each other,
>
> allow the pattern of our bodies
> to pulse together underneath
>
> our uneven tangles, fool
> the laws of physics until
>
> we can behave as light.

In this passage it is the light, and the process of cheating the laws of physics with it, that becomes the metaphor for the process of lovemaking, in which the light, now the soul, can also begin to cheat death. Or, at least, make it possible for the love connection between the speaker and the ‘you’ to continue after death. Heaven becomes the ‘diametric drive’ through which it would become possible for the couple to ‘travel together / in the same direction forever.’

‘To Be Young’ uses a variety of cosmological and biological images within the overall metaphor of the individual addressed in the poem, the ‘you’, might experience as a young person going through the emergence of being, and also the desire for physical love. The poem begins with the ‘tiny dot’ of super-compacted core

matter presumed to be the what existed prior to the 'Big Bang', considering what that might feel like experienced bodily: 'like every spark in the dark universe / is trying to find its way out though / your veins.'[403]

The poem pulls this individual through 'layers of silt and sand', indicating the early part of the Earth's formation, as well as what giving the poem a distinct directional and spatial movement from 'inside' to 'outside'—above ground, and then into the atmosphere. The 'rocket thrusters of your hips' in the poem begins to indicate, along with the 'hiss' of 'photosynthesis' 'seething in every / greedy kiss' that the culmination of physical desire is the culmination of becoming when one is 'Young.'

The final stanza, which breaks out of a fairly tight if at points informal line structure, expands substantially on the page in terms of white space. The words are single or in pairs, spread apart from each other. The effect of this mimicks that of the expanding of the universe that has been continuing since the 'Big Bang.' The big bang here, also, is that of orgasm. Throughout the poem a sensory experience is made hyper-sensory through the direct comparisons with larger scientific processes, which have lead to a deeper understanding of our origins.

Carroll began his discussions of literary metaphor and science by examining Rukeyer's 'The Conjugation of the Paramecium', which uses the aforementioned biological process as a metaphor for human intimacy. Rukeyser is one of the post-war poets of interest to Middleton for her engagement with science during this period. However, his attention focuses on the poets' methodological experimentation employed in their approach to writing poetry rather than the simple application of science as metaphor. Because, intermixed with their 'physics envy' was not just

[403] Barnes, p. 15.

hostility but admiration and aesthetic appreciation—which in some cases lead them to 'respectfully or skeptically' borrow, test, and experiment 'with its methodological strategies.'[404] These poets used 'the poem itself as a site of experimentation.'[405] While the poems in *Twelve Foundation Stones* do at times experiment with form in different ways, there is a primary method of experimentation that is manifested in the longer poems in the collection, along with the final series.

Though Carroll's brief essay focuses mainly on metaphor, he makes a suggestion that can be carried beyond straightforward metaphor into the way one may handle scientific concepts through larger applications within poetry. For he suggests that a piece of creative literature 'need not be explicitly about scientific themes,' but one could either use them as background material, or take a scientific concept and use what is suggestive about it towards the workings of human nature in a completely separate context.[406]

The prose-poems series 'Twelve Foundation Stones of the New Heaven' was created as an experiment with the prose-poem form, an investigation into the hypothesis of combination as synthesis in the form of 'braiding,' and the exploration of a way to apply what is stimulating about both scientific, religious, and spiritual concepts and contexts in a discreet manner.

### The Prose Poem and the Braid: Experiment

The braiding technique that I describe is essentially taking three separate, yet communicating, subjects or concepts and weaving them together into a cohesive whole. As has already been mentioned, the long poem 'Out of Sight' brings together the search for Malaysia Airlines Flight 370, which mysteriously disappeared shortly

[404] Middleton, p. 35-36.
[405] Ibid., p. 46-47.
[406] Carroll, p. 5.

after departing Kuala Lumpur airport en route to Beijing in March 2014[407], the search for the deep space neutrino, and the biblical prophet Elijah, who famously disappeared into heaven from a mountaintop (The Bible, 2 Kings 2). These strands are given their own sections within the poem, but as they are woven in and out, various transitions are provided by the linguistic and imagistic cues, helping to link them, such as the 'fire chariot' that swept Elijah off to the heavens and the 'winged chariot' of the airplane.[408]

Intrinsic within the poem is the discomfort with immaterial materiality as well as invisibility, uncertainty, and disappearance. Within the search for the neutrino and its 'massless whispers' is what Tiffany describes as 'what atomism makes of our bodies: a world of words (and pictures) where bodies are made of dust and shadows.'[409] This disturbing emptiness is mirrored in language surrounding the plane's disappearance, along with all of the human individuals on it, in the poem's first section:

> …hope and fear, the ghosts
> of certainty, the massless
>
> heft of grief that seems
> to interact with nothing.
> The empty integers of the unfound.[410]

This references the massless properties of neutrinos, which can easily pass through Earth without detection in the usual sense because they do not interact with matter, and this makes them so difficult to find. The 'empty integers of the unfound' signify the seeming evaporation of human life into nothingness, and the fact no trace of them

[407] Macleod, C., Winter, M. and Gray, A. (2014) 'Beijing-bound flight from Malaysia missing.' USA Today. 8 Mar. Available online: http://www.usatoday.com/story/news/world/2014/03/07/malaysia-airlines-beijing-flight-missing/6187779/ (Last accessed 3 Jan 2017)
[408] Barnes, p. 7.
[409] Tiffany, p. 134.
[410] Barnes, p. 7.

has been detected in the months following their disappearance. Other imagistic and linguistic clues occur in the 'burst of light' that takes Elijah and the 'flashes of light' in ice in the search for deep space neutrinos, as well as the underwater sounds that link the neutrinos to the possible sound of the plane crashing into water.

The other long poem in the collection, 'Autumn Leaves and Summer Stars,'[411] uses a similar approach. There are three primary concepts from science that are brought into the poem—that of gamma oscillations in the brain at the time of death, the life cycles and deaths of stars, and the process of tree leaves dying in Autumn. These all are interwoven within a narrative of my last time seeing my paternal grandfather, who had Alzheimer's disease, prior to his death. The processes of dying in each sense—stellar, arboreal, and neurological—are linked together with details of description (some of these associated to colour as the colours red, yellow, and blue recur), as well as lines of inquiry about how they might be the same, in some meaningful way. The final section brings together more subtle inclinations towards a possibility spiritual reality, or simply a reality beyond that we can experience empirically, recounting the eerie 'conversations' my grandfather had with someone not in the room. In turn, the 'conversation' of thematic elements in the poem is intended to culminate here between the recounted details of experience, the 'facts' of science, and the elsewhere implied interconnectedness and mysteries of brain function.

The experiment of 'braiding' (taking three separate ideas, one based in science, one based in the experiential, and one based in spirituality or religion) – lead me to the 'experiment' of employing the prose-poem form in the series 'Twelve Foundation Stones of the New Heaven.' The originating ideas for the series

[411] Barnes, p. 24-27.

surrounded the beauty and allure of Hubble Telescope images of various cosmic bodies. Their glittering appearance and vibrant colour, though at times a result of filters placed on the camera to detect chemical makeup, had always brought to mind that of precious gems. The process of seeking a more extended form for these ideas lead to Chapter 21 of the Book of Revelation, a passage that gives account of the author's ecstatic vision in which God reveals '"a new heaven and a new earth," for the first heaven and the first earth had passed away…the Holy City, the new Jerusalem, coming down out of heaven from God' (Revelation 21:1-2). These foundations of the 'holy city of the new heaven'…

> …were decorated with every kind of precious stone. The first foundation was jasper, the second sapphire, the third agate, the fourth emerald, [20] the fifth onyx, the sixth ruby, the seventh chrysolite, the eighth beryl, the ninth topaz, the tenth turquoise, the eleventh jacinth, and the twelfth amethyst. (Revelation 21: 19-20)

These twelve stones became the framework for the series, which then guided the selection of Hubble Telescope images for each of them. Two central motives lead me further into the experiment of the poems. Firstly, I found that the Hubble Telescope images of various bodies and phenomena in space had a very beautiful gem-like quality to them and the alignment was imaginatively natural to me. When I saw an image of Neptune, I saw aquamarine, when I saw a close-up image of Jupiter's storms, I saw agate, and when I considered a cluster of stars, I could envision lapis lazuli. Secondly, the collection deals with concerns of cosmology and astronomy, science of the "heavens," seeking to explore reinvention of spiritual language in light of scientific ideas in these fields. The inclusion of these stones from Revelation, with a nod to the new "heaven" being that of space, seemed the appropriate way to hold all of these concepts together poetically.

A primary technique throughout the series of poems came from the use of descriptive language: the descriptive terms employed would need to describe all three elements, the gemstone, the astronomical image, and the experience being portrayed within the poem itself. These terms usually had to do with colour, but also luminosity and texture. This was a challenging component but one that contributed to the success of the experiment, as a resulting unity.

The accuracy of the precious stones required some research, as the stones at the time, historically, were sometimes not accurate to the name given in biblical translation. An online gallery[412] provided surprisingly meticulous background information on the stones, which I validated against Thaddeus Mason Harris's *The Natural History of the Bible*.[413] The details of the mineral makeup of the stones, their physical characteristics, and use during biblical times also informed how I chose to use descriptive language in the poems.

'Foundation Stone One – Jasper: Supernova Remnant N 63A' begins by describing an 'aggregate of every bonfire' experience the speaker has had, beginning with a noun that connects to the overall concept of a group of stones, and leads into a series of three personal experiences described with the context of the supernova remnant and the stone in mind.

The colour patterns in the Hubble image of the supernova remnant contains a combination of red, blue, green and white filters that give it a spectral appearance, including those colours described in the poem: 'orange, red, yellow, tallow-green.'

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[412] 'Precious stones of the Bible.' Available online: http://www.preciousstonesofthebible.com/stonegallery.html (Last accessed 3 Jan 2017)

[413] Harris, T.M. (1824) *The Natural History of the Bible: A description of all the quadrupeds, birds, fishes, reptiles, and insects, trees, plants, flowers, gums, and precious stones metioned in The Sacred Scriptures*. London: Printed for Thomas Tegg, 73, Cheapside.

Jasper at the time of Revelation's writing supposedly indicated a green jasper, which tends to also have other colours, such as red and orange, blending in patches on the surface, which linked the image at the experience together. The explosion in the centre of the image appears flame-like, and corresponds to the image of the bonfire at the heart of the three experiences described in the poem's paragraphs/stanzas. The line 'Nothing's ever lost' is intended to recall the law of the conservation of energy, which declares that energy cannot be lost, only transformed.

The 'last outpost of the evening' in the ending stanza speaks to the concept of the heat death of the universe, which proposes that at some point in the future of the universe, the universe will no longer sustain generative processes. However, supernova remnants provide the catalyst for new star formation, which is reflected in the hopeful ending image of allowing 'the morning birds to come,' as well as a spiritual impulse of hope against final annihilation.

Each of the poems in the series follows a similar intention of corresponding language to the purpose of uniting the three components. In the second, a spiritual experience of being alone in the desert and looking up at the night sky is explored within the context of lapis lazuli and the Core of Globular Cluster 47 Tucanae, which is a glittering blue spherical collection of stars of incredible magnitude. In this instance lapis lazuli is used in place of the stated sapphire, as sapphire as we know it today was not available during the time of Revelation's writing. Descriptions such as 'the arm of the Milky Way' adding 'its rich striation to the sky' are drawn also from the striations seen in lapis lazuli. The overall experience of recognising the vastness of the universe, yet one's integral part, is a central theme of the poem.

Several of the poems are drawn from actual experiences, but an imagined experience, representing actual truths about a personal relationship, is explored in

‘Foundation Stone Seven.’ This is a poem addressed to my mother, who is embodied in the larger figure that seems to appear in profile above that of an infant child within the Hubble image of the Pillars of Creation (Detail of Base). The very warm-coloured image of this iconic star-forming region—emulating the colour of topaz, the relevant foundation stone—corresponded with associations of comfort, and also of gestation and nurture, which lead to the image of ‘a curtain luminescing with all the elements to feed me, all the raw material for sparks I would ever need.’ There is also a reference to Elizabeth Bishop’s poem ‘A Miracle for Breakfast’ in the ending lines: ‘crumbs of it, on my plate, glints of it, in my cup.’

One of the principles for the spiritual significance of the series was that my own personal spirituality had become heavily linked to cosmology and science, and to the idea that what science reveals of the universe is sacred. I wanted to explore this within the framework of personal human experience and science-related imagery, whilst experimenting with how the individual components would align. Though I initially considered the formal possibility of sonnets for the series, the prose-poem form emerged as a better choice due to the fluidity and circularity of text within it.

My purposes in choosing the prose-poem form had to do with several characteristics. As a form of hybrid writing, it already had the potential of combining disparate elements together. The inherent lyric focus on image over narrative, albeit whilst not eliminating narrative elements, was helpful in focusing the descriptive language of the poems. Also the longer lineation, through the form’s permission of paragraphs over stanzas, allows for the circling of a central idea that may be complex and require a move away from the finality and fissioning of line breaks and stanzas. As the poems required several layers of linguistic processing, the form accommodated this need in a way a more rigid form would not. The overall experiment accomplished

the ‘braid’ of the science, spirituality, and experience elements whilst creating a resonance between them through a consistency of method.

## IMAGE AS AXIOM: OBSERVATION & HYPOTHESIS

> I knock on the stone’s door.
> —It’s me, let me in.
> I’ve heard of your vast empty halls,
> unseen, barrenly beautiful,
> earless, echoless, untrodden…
>
> —Vast, empty halls—says the stone—
> but there’s no room in them.
> Beautiful they may be; but alien
> to your beggarly senses.
> You may recognize me; but experience me—never.
> My whole surface lies towards you;
> my whole interior is turned away.
>
> -- Wislawa Szymborska, ‘Conversation with a Stone’

From the time of the Greek atomists Lucretius and Epicurus, who, as Midgley points out, could not supply concrete examples and ‘had to convey their point through the necessarily vague medium of imagery’[414], to what Tiffany calls the ‘crisis of visualisation’[415] in physics of the 1920’s (which came to be resolved by Richard Feynman’s famous diagrams, though these were initially regarded with suspicion[416]), science has relied upon ‘images or artifacts’ to depict ‘material phenomena beyond the limits of sensation’[417]. This process is quite arguably related to literary tropes, particularly the very way that poetry employs image.

Middleton recounts the situation of Robert Marshak, writing for *Scientific American* in 1960, expressing carefully the unease of the quantum experimenter. Marshak, quoted by Middleton, reminds the reader that, despite his descriptions, the

[414] Midgley, p. 33.
[415] Tiffany, p. 246.
[416] Ibid., p. 247.
[417] Ibid., p. 35.

actual particles are not visible to himself and other quantum researchers, but only 'the recording devices of the particle-counter, or the dark spots on photographic emulsion.' The experimenter in this position must go to a theoretical physicist and ask about what force could create the graph or image generated. Middleton uses this to help to explain what Marshak means by 'semifictional particle language' employed by a physicist when speaking to a nonphysicist. This language is also called 'semiphenomenological' because these 'images have some relation to [sensible] actuality, but no one is clear just how.'[418] It is language used to propose characteristics of reality, but acknowledge uncertainty and limitation to apprehending the complete picture. Semiphenomenological language is the best way to approximate what we know of, but cannot see. Middleton follows that perhaps the 'poem could also be a self-reflexive process' capable of 'making explicit…its own "semifictionality" or "semophenomenology,"'[419] through a process of '[s]imulating the rigor of physics…an empirical approach to observation.'[420] The poetic equivalent would be what poets might term 'a poetic language of diminished referentiality.'

Tiffany takes this idea a step further, and examines the other extreme from Middleton's, bringing Kant into the equation, who says that to things…

> …'exemplified in experience' the poet 'gives sensible expression in a way that goes beyond the limits of experience, namely with a completeness for which no example can be found in nature.'[421]

In this way, a poem has a place in creating reality: 'Poetry therefore apprehends sensuous nature by inventing it.'[422] However, in doing so, in creating images that

[418] Middleton, p. 79.
[419] Ibid., p. 85.
[420] Ibid., p. 85.
[421] Tiffany, p. 28.
[422] Ibid., p. 28.

'exceed the qualities of intuitive experience or understanding,'[423] poetry 'places "illusion" in the services of understanding, devising impossible pictures of nature that bring us closer to the substance of nature than "mere imitations."'[424] Through poetry's ability to draw upon language and generate a more imaginative, hyper-sensory image, something that may not have a direct correspondent in actuality, the new aid to knowledge is created by giving a comprehensible 'body' to what cannot be directly perceived. Tiffany explains that this is part of what links poetry and science together:

> Certain plausible correspondences between science and poetry can therefore be traced to shared forms of material and imaginative practice, but also to the basic inclination of materialism: to make the intangible tangible. Both science and poetry proceed, in part, by making pictures of what we cannot see (or what merely escapes our notice), by attributing corporeal qualities to inscrutable events.[425]

Our understanding of reality depends on the pictures we create of it, and that includes the images in poetry, entertained in the mind as hypothetical reality. In other words, the only way that certain levels of reality are comprehensible at all is through these imaginary pictures.[426] Tiffany guides us towards the lyric device of conceit, and via his examination of 'the meteoric body of a snowflake' (this one belonging to Kepler), demonstrates the ways in which the conceit resembles 'the scientific method of hypothesis' through its processes of visualisation and depiction, which are also the methods by which one can visualise and objectify something below the threshold of sensation or consciousness.[427]

Which leads us to how an image may function as an axiom within a poem—a proposed statement on reality taken to be true in order to further explore its possibilities. And, within that, to show how language taken as a referent of an

[423] Ibid., p. 28.
[424] Tiffany, p. 274.
[425] Ibid., p. 5.
[426] Ibid., p. 3.
[427] Ibid., p. 100.

external, physical reality may form the basis, but not the limitation, of how imagery can present as comprehensible a less accessible reality, or examine some aspect of experience in a new context.

'Professor Wheeler's Electron' is an example, to some degree, of both Middleton's and Tiffany's proposals for the poetic image. The poem begins with an uncertain hypothesis, originating through considering the possibility of a one-electron universe, proposed by John Wheeler to Richard Feynman during the spring of 1940.[428] Through observations stated within the poem's first stanza—'Maybe everything is round' and 'Maybe everything spins'—the hypothesis is developed.

The poem employs stanzaic anadiplosis, repeating the last phrase of the stanza just prior as the beginning phrase of the one following. This creates a sense of continuity, of all parts being a part of a single whole within the poem, as reality is made up of a single whole within the electron—with location being the only diversifying factor. This factor is addressed through the image of the blanket, which is used metaphorically to represent the electron's differing locations, but also brings the speaker's physical reality into the poem, which she is consulting in order to make sense of her hypothesis and her experiences.

There is a struggle with notions of physicality and materiality inherent in the poem, with the speaker's belongings 'Hard and real, they have / a shape'. The handling of these belongings to pack a suitcase is a battle against inertia—it 'makes / the whole universe seem heavy', 'still', and 'silent.' This hyperbole leads, however, to possibility. The final instance of anadiplosis is the phrase 'could be,' going against the definitive statement of what the universe 'is' in the previous sentence. The hypothesis is tested, but the results are not, and may never be, definitive.

[428] Barnes, p. 20.

The ending stanza employs a simile to compare the speaker's experiences with the movement of an atom, perceived in terms of constant movement, both within itself and within the universe. Then there is a shift, once again, to physicality—a 'stone drops in water,' yet these are how words feel, also something intangible. But the notion of gravity, the notion of spinning and movement again, close out the poem. And these perceived physical forces have an impact on the speaker's concepts of reality. As Tiffany evidences in his critique of materialism in modern physics, 'the atom, which often marks, or lies beyond, the limits of sensation and analysis, and…its abstract nature affects our sense of what stone is, or flesh, or water, or fire.'[429]

'Singularity's Sum' handles its propositions much more definitively. The opening stanza provides imaginative, disembodied biological imagery ('electrical fidgeting / across a web of mysterious lightning' depicts the brain; 'calcium carbonate scaffolding' depicts the skeleton) before leading to a couplet that delivers the hypothesis: 'Broken down into components, / very little is singular.'[430] This bodily imagery is then extended to God, the only poem that references God directly aside from 'The Toe of God', in which it is but a caricature of God that makes a cameo.

God's body also has blood and bones, reflecting the human body of the first stanza, but these and other parts are defined in terms of cosmological and astronomical imagery: 'dark matter', 'Higgs Boson', 'stardust', 'auroras' and 'novas'. The reader is then brought back to the human body, but this time to the brain, in the third full stanza. There is an imperative command to 'Look at this image of the brain,' and this image, a diffusion tensor magnetic resonance image of brain activity[431], is

[429] Tiffany, p. 7-8.
[430] Barnes, p. 4.
[431] Lee, A. (2016) 'Diffusion Tensor Magnetic Resonance Imaging of the Brain.' *Creativity and the Default Mode Network*. Bath Spa University PhD Student Writing Retreat; private presentation. Bradford on Avon. Feb 2016.

then described in figurative terms. The poem employs unexpected pairings of gemstones: 'garnets / striking lightning', 'peridot meteors', and 'bundled threads / like veins of quartz'. These describe the associationist connections in the brain evident on the DTM image, rendered in bright coloured feathery strands bundled together. The final line of this stanza connects us back to broader 'universe,' and in the final stanza of the poem, we see a similar image, yet this is of Laniakea,[432] the 'local' supercluster of galaxies that is home to our own Milky Way. The strands of galaxies on this astronomically vast image are 'unfurling into filaments / like a dendrite, feathering gold / threads.' A link is then directly created between the brain image and Laniakea: this is a 'supercluster of God-thoughts,' yet one among many. The poem uses the perceived relations between these ideas, through figurative imagery, to propose referents beyond the threshold of sensation.

However, as much as the poem would purport to reveal the many component parts of God, the universe, the brain, and reality, there is not an assertion that these parts are more significant than the whole. The dynamic and various imagery is instead meant to show the vastness and intricacy of where we might, hypothetically, fit into the cosmos at large.

Poetry's capacity to create new imaginative images is a part of its value, especially in terms of the dialogue between science and spirituality. Midgley discusses the prolonged impact of scientific imagery, particularly that of the atom and the machine, and how these cast a long shadow. Because of this, new images are needed: 'No picture should be allowed to become an imaginative monoculture. They

[432] Gibney, E. (2014) 'Earth's new address: 'Solar System, Milky Way, Laniakea.' *Nature Journal*. 03 Sept. Available online: http://www.nature.com/news/earth-s-new-address-solar-system-milky-way-laniakea-1.15819 (Last accessed 02 Jan 2017)

all need to be corrected sometimes by other ways of thinking.'[433] These images contribute to visions that become established within culture, such as myths. She points to E.O. Wilson's (1978) vision of scientific materialism as an alternative mythology to religion.[434] But is it sufficient? Based on several of its shortcomings navigated herein, it may not yet be enough. But perhaps alongside several other maps and windows, per Midgley's analogies, a new holistic vision may be revealed. Science must indisputably be a part of it.

The Chinese-American poet Li-Young Lee (2012) sees 'formal religion as taking calcified images and worshipping them…but the poet is making for himself or herself fresh religious images.'[435] In this way, the poet, considering the emotions and experiences of the spiritual, inner, and subjective experience, transforms them to eliminate a stagnant structure that others have created before him. The poet is making them individual, but also, by way of the possibilities of poetic language, making this brand new spiritual image potentially universal to his reader. Within these possibilities of poetic language lay the opportunities for dialogue across a number of thought systems. It is where scientific language can potentially become an essential part of the spiritual human experience, by becoming incorporated into these new images, and new inclusive myths can be imagined. And science's epistemological structures are an essential scaffolding on which to build a new whole, a new possibility for the united self.

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[433] Midgley, p. 278.
[434] Ibid., p. 277.
[435] Lee, L.Y. (2012) 'The Subject is Silence'. *In*: I. Kaminsky & K. Towler eds. *A God in the House: Poets Talk About Faith*. North Adams, Massachusetts: Tupelo Press. p. 127.

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Appendix

**Tracy K. Smith**
**My God, It's Full of Stars**

[Poem redacted in this digitized version due to potential copyright issues]

**Tracy K. Smith**
**Don't You Wonder, Sometimes?**

[Poem redacted in this digitized version due to potential copyright issues]

**Pattiann Rogers**
**Millennium Map of the Universe**

**(from the National Geographic Society)**

[Poem redacted in this digitized version
due to potential copyright issues]

**Pattiann Rogers**
**Angels of the Atom**

[Poem redacted in this digitized version due to potential copyright issues]

**Miroslav Holub**
**Dreams**

[Poem redacted in this digitized version due to potential copyright issues]

**Miroslav Holub**
**The Earliest Angels**

[Poem redacted in this digitized version
due to potential copyright issues]

**Miroslav Holub**
**The Soul**

[Poem redacted in this digitized version
due to potential copyright issues]

**Miroslav Holub**
**Crush Syndrome**

[Poem redacted in this digitized version due to potential copyright issues]

**Miroslav Holub**
**Creative Writing**

[Poem redacted in this digitized version due to potential copyright issues]

**Tracy K. Smith**
**IT & CO**

[Poem redacted in this digitized version

due to potential copyright issues]

**Pattiann Rogers**
**Life In An Expanding Universe**

[Poem redacted in this digitized version due
to potential copyright issues]

**Nadya Aisenberg**
**Sum**

[Poem redacted in this digitized version due to potential copyright issues]

**Albert Goldbarth**
**One Continuous Substance**

[Poem redacted in this digitized version due to potential copyright issues]

**Albert Goldbarth**
**The History of Buttons**

[Poem redacted in this digitized version due to potential copyright issues]

**Albert Goldbarth**
**Units**

[Poem redacted in this digitized version due to potential copyright issues]

**Miroslav Holub**
**Brief reflection on accuracy**

[Poem redacted in this digitized version due to potential copyright issues]

**Miroslav Holub**
**Brief reflection on an old woman with a barrow**

[Poem redacted in this digitized version due to potential copyright issues]

**Geoffrey Lehmann**
**The Golden Wall**

[Poem redacted in this digitized version due to potential copyright issues]

**Louis Simpson**
**Physical Universe**

[Poem redacted in this digitized version
due to potential copyright issues]

**Alison Hawthorne Deming**
**Mt Lemmon, Steward Observatory, 1990**

[Poem redacted in this digitized version due to potential copyright issues]